October 1963

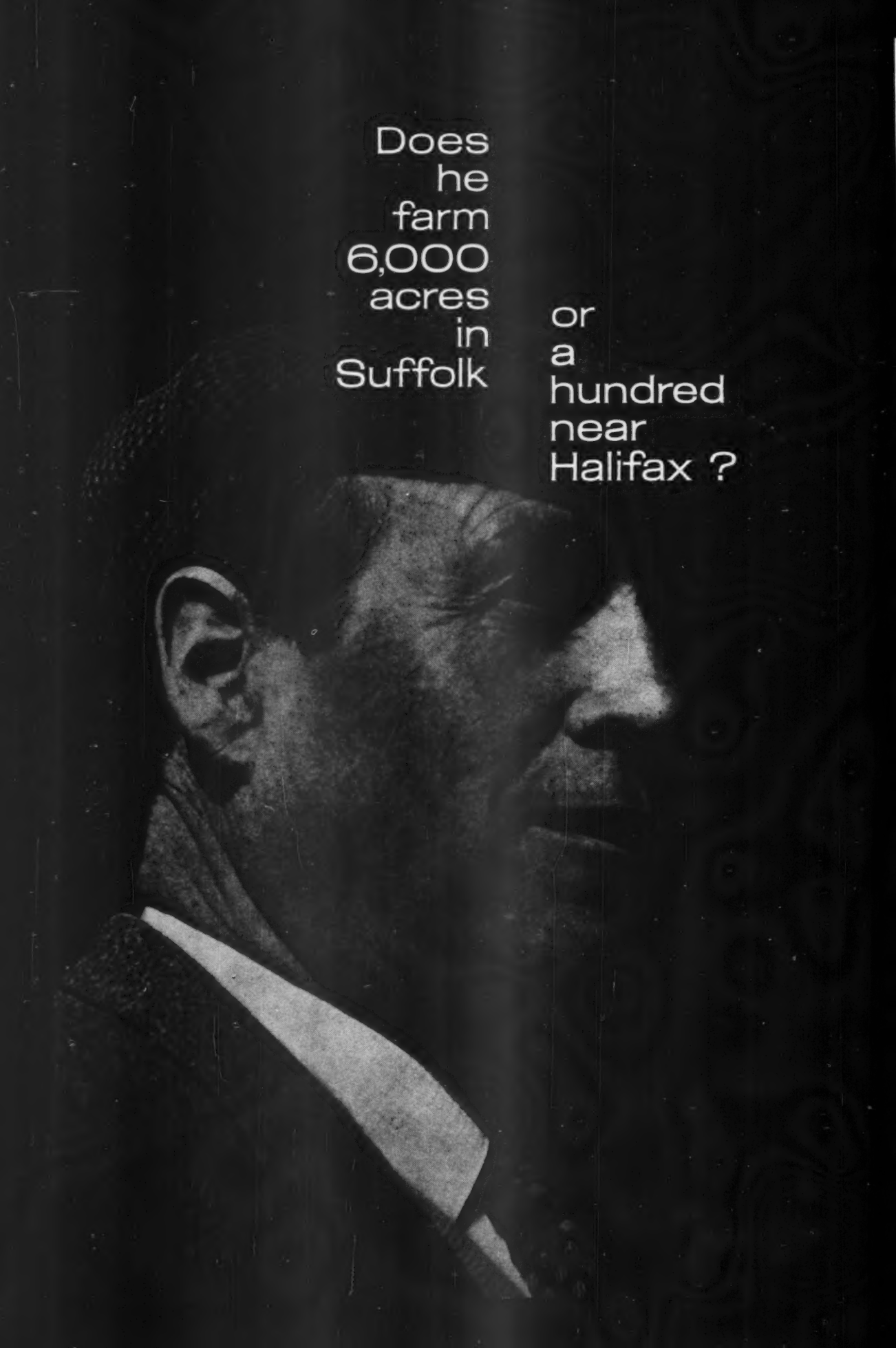
21 OCT 1963

culture

SELECTED CONTENTS

Taking Sheep off the Hills in Winter . . . *M. McG. Cooper*
A Farmer in Business . . . . . *Bryan Platt*
Broiler Rabbits . . . . . *R. F. R. Glanville*
Caution with Kale and Rape . . . . . *F. G. Clegg*
Pioneers of Modern British Farming: Roland Dudley . *Ralph Whitlock*
Plant to a Policy . . . . . *W. L. Hinton*
Horse Breeding on a Mixed Farm . . . . *Patricia Lindsay*
Electrically Heated Floors for Cattle Yards *T. Kendrick Gething and E. J. Davies*
Visit to Bulgaria . . . . . *W. E. Shewell-Cooper*

Published for the Ministry of Agriculture, Fisheries and Food by Her Majesty's Stationery Office


Does
he
farm
6,000
acres
in
Suffolk
or
a
hundred
near
Halifax ?

THERE'S AN ICI COMPOUND FOR HIM!

Today's farmer tries to simplify his job. That's why the ICI range of fertilizers—compact, yet so versatile—suits him so well.

And he knows he's getting compounds that have been proved by practical farming. ICI combine the most modern manufacturing techniques with more than thirty years experience of research and development in the interests of British farmers. Every ICI fertilizer has been tested on big farms and small in all parts of the country.

When you buy ICI you're buying experience—and you profit by it!

THERE'S AN ICI COMPOUND FOR YOU:

ICI No. 1 (12.12.18) for all-round value. **ICI No. 2 (22.11.11)** for extra nitrogen with high concentration. **ICI No. 3 (10.20.20)** for low nitrogen, high concentration. **ICI No. 4 (15.10.10)** for high nitrogen. **'Kaynitro' (16.0.16)** the perfect partner for basic slag. **'Nitro-Chalk'** to match the compounds. All packed in polythene.

RELY ON ICI - AND PROFIT BY EXPERIENCE

Sources of Finance for Farmers 1963-64
BARCLAYS BANK
Sources of Finance for Farmers 1963-64
BARCLAYS BANK
Sources of Finance for Farmers 1963-64
BARCLAYS BANK

'Sources of Finance for Farmers 1963-64'

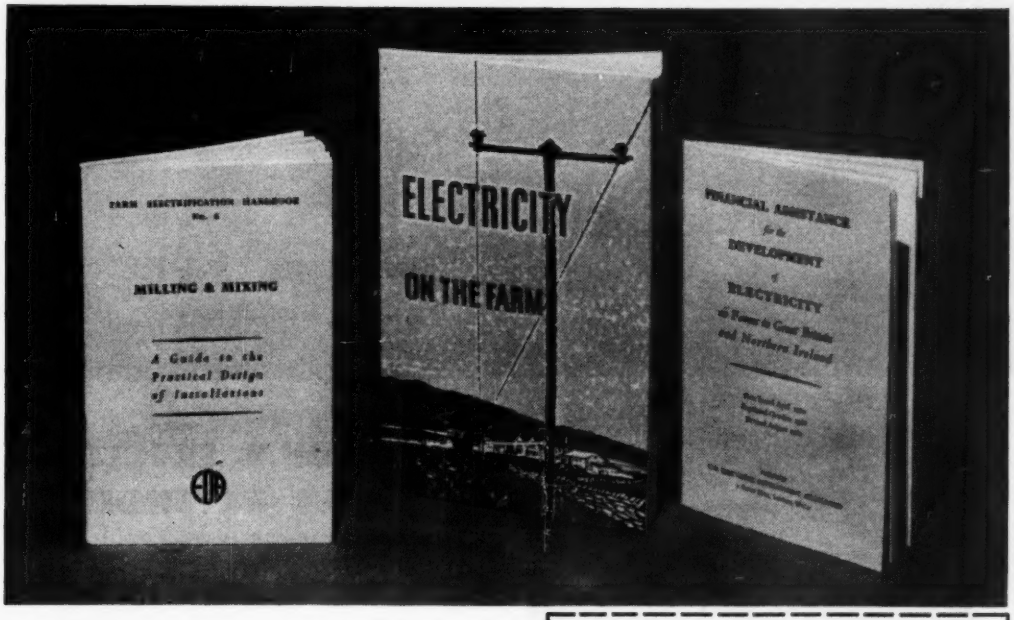
has been written by Barclays Bank, in consultation with the Ministry of Agriculture, for the assistance of farmers and others interested in agricultural finance. Copies, which are of course free of charge, may be obtained from any branch of the Bank.

BARCLAYS BANK

Money is our business

MILL and MIX on your own farm by electricity

—*these FREE booklets tell you how*



ELECTRICITY runs machines that ensure correct milling and mixing of feed – right on your own farm. This means greater profit for you. Find out about electric milling and mixing machines, how they are installed, how they work, which is best for you – it's all in these booklets.

To get your copies, apply to your Electricity Board or fill in and send this coupon.

ELECTRICITY – saves labour, requires the lowest capital outlay, operates with the most flexibility

To: Electrical Development Association (R/AR)
2 Savoy Hill, London, W.C.2

FREE

Please send me the free copies of: E.D.A. Handbook No. 6 – Milling and Mixing, Electricity on the Farm, Financial Assistance for the Development of Electricity.

NAME .....

ADDRESS .....

.....

.....

Get up to date—go electric

AGRECON

CONCRETE BUILDINGS

FOR RAPID ECONOMICAL DEVELOPMENT

*** SPEEDILY ERECTED**

*** EASILY EXTENDED**

AGRECON PRECAST CONCRETE BUILDINGS are the sensible answer to your need for rapid and economical expansion, with negligible maintenance costs.

The photographs show a 65′ span covered cattle-yard, flanked by two 37′ 6″ span silage buildings, each with a milking parlour at the rear, and, (bottom) a piggery comprising a 50′ centre span with two 15′ span lean-to's all 135′ long.

PLEASE WRITE OR PHONE FOR LEAFLET OR A CALL BY YOUR AREA REPRESENTATIVE

CONCRETE UTILITIES LTD., Dept. A/10. WARE, HERTS. Phone 2272-6

Works at:— WARE · LIVERPOOL · NEWCASTLE · COLEFORD (GLOUCESTER)

Agriculture

VOLUME 70 · NUMBER 10 · OCTOBER 1963

Editorial Offices
Ministry of Agriculture, Fisheries and Food
Whitehall Place, London S.W.1. Trafalgar 7711

CONTENTS

Potatoes—Shallow Storage 457
Taking Sheep off the Hills in Winter *M. McG. Cooper* . . . 458
A Farmer in Business *Bryan Platt* 462
Broiler Rabbits *R. F. R. Glanville* 467
Caution with Kale and Rape *F. G. Clegg* 471
Pioneers of Modern British Farming: Roland Dudley *Ralph Whitlock* 474
Trespass *G. F. Aronson* 477
Plant to a Policy *W. L. Hinton* 479
Horse Breeding on a Mixed Farm *Patricia Lindsay* 483
Electrically Heated Floors for Cattle Yards *T. Kenrick Gething* and *E. J. Davies* 487
Visit to Bulgaria *W. E. Shewell-Cooper* 490
Milk—Future control of hygienic quality in England and Wales . 494
Ministry's Publications 495
Farming Cameo Series 3: 9. South-West Cheshire *H. V. Lea* . 496
Your Fixed Equipment: High, Wide and Handsome *George Young* 498
In Brief 500
Book Reviews 503

Provided that the source is acknowledged in each instance such articles and notes as are published in this Journal without any specific reservation regarding copyright may be reproduced in any registered newspaper or public periodical without special permission. The Ministry does not accept responsibility for statements made, or views expressed, in signed contributions to this Journal or in those reproduced from another source.

Further, the Ministry does not accept responsibility for any of the private and trade advertisements included in this publication.

In the interests of factual reporting, occasional reference in this Journal to trade names and proprietary products may be inevitable. No endorsement of named products is intended, nor is any criticism implied of similar products which are not mentioned.

All communications respecting advertising in the Journal should be addressed to the Advertisement Contractors, Cowlishaw and Lawrence (Advertising) Ltd., Memorial Hall Buildings, 16 Farringdon Street, London E.C.4. Telephone: City 3718.

How BILSTON balances the dairy farmer's daily phosphate losses

Morning and evening, 365 days in the year, the dairy farmer sends phosphate away in his milk churns. Every 1,000 gallons of milk removes 25 lb of P_2O_5. And all this phosphate – plus the phosphate a dairy herd needs for health and reproduction – comes mainly from grassland.

The successful dairy farmer takes no chances in replacing this. He makes sure of phosphate-rich herbage and of pastures that persist, by applying 5 to 10 cwt of Bilston Basic Slag to every grass field at least once every three years, in addition to suitable compound fertilizers. Bilston meets his needs at a low cost. Because of its high citric solubility (always over 90%) it is quick acting, long lasting. And it also supplies lime, magnesium and a range of trace elements.

For lighter soils get Fisons K-Slag – (a mixture of Bilston and muriate of potash) – the highest grade potassic slag available (14% P_2O_5: 10% K_2O).

Ask your Fisons Merchant for Bilston.
Head Office: Harvest House, Ipswich, Suffolk.

POTATOES

SHALLOW STORAGE

How much better indoors if we should get another winter like the last one!

IF, with last winter's deep-probing frosts still in mind, you are thinking of putting your potatoes indoors this year, it is comforting to know that practically any closable building conveniently accessible to vehicles would be suitable for shallow storage. This can be of any height up to 8 feet, provided the walls are sound. Special reinforcement is rarely necessary, except for 4½-inch walls.

The air in the building should never be allowed to fall below 30°F (43°F for a high quality trade) and it will help to secure this if the structure is lined thickly up to 1 foot above the storage level with baled or battened straw (or some form of insulating board).

A layer of loose (not baled) straw at least 18 inches thick should be placed over the potatoes. This is better than battens.

A Dutch barn or other open-sided building is not entirely satisfactory, in a winter such as the last one, if for no other reason than that you lose the advantage of being able to grade because the temperature in the grading area may be well below freezing.

With the air at 30°F or above, there would be no danger of freezing, but undesirable sweetening could well occur. To avoid this, if the farmer is interested in high quality ware, the building should be such that the twenty-four hour average temperature should not in general fall below about 43°F.

If the crop has to be lifted wet, some means of bottom ventilation is a worthwhile safeguard. In shallow stores this can best be provided by slatted wood ducts, set at 6-feet centres across the floor, opening them to the outside of the building at both ends. But keep them closed in hard weather.

So stored, your potatoes should keep well at least until the end of March, but a dusting with a proprietary sprout-suppressant dust may be all to the good. If there are ducts, Nonanol can be used instead to prevent sprouting.

Greater productivity, better grazing, fewer losses. These are just three of the advantages to upland farmers which Professor Cooper sees by

Taking Sheep off the Hills in Winter

M. McG. Cooper

AN agrarian Rip van Winkle who went to sleep in the 'thirties would find himself completely lost in the 'sixties in all but one sector of British farming, namely, the uplands, which are principally devoted to the running of hardy breeds of sheep. It is true, thanks to subsidies, that there has been an increase in the number of cattle on these hills and there has been some improvement and extension of in-bye land, but there have been no changes comparable with those in the lowlands, which have undergone a revolution in farming practices. There has been no appreciable change either in individual performance of sheep or in carrying capacity of land, except where expensive reclamation schemes have been attempted.

Limitations of the upland farmer

Such schemes have been few and far between, for low productivity initiates an unfortunate economic circle. The upland farmer has neither the income nor the economic justification, with his present style of farming, to set about improving the quality of his grazings. He is limited by the bottle-neck imposed by the winter, and so he relies on hardy and not very productive ewes; for his main concern is to get his flock through the hungry months of the year as cheaply as possible.

During the summer there is undergrazing of the hill, and this results in a serious deterioration in the quality of the herbage, but the farmer cannot afford to subdivide his hill pastures to concentrate his grazing stock nor

to increase their numbers, since he knows full well that the winter will catch him out. He has come to accept eighty weaned lambs per hundred ewes mated to be a satisfactory return, and he is satisfied with an average wool clip of under 4 lb per ewe.

This is all the winter allows him to expect. Indeed, every few years, so little control does he have over the winter environment of his stock, he can expect catastrophic losses which can cut not only his gross income by half but also make very serious inroads on his capital investment in stock. Winters like this last hang like a sword of Damocles over his head and provide another barrier to an intensification of his farming effort.

Why not house breeding ewes?

Recently Sir James Denby Roberts, commenting on the progress of the Glenlochay project in Perthshire, expressed the view that little more progress could be made there so long as conventional lines were adhered to, because of the limitations imposed by winter-carrying capacity. And this notwithstanding that he and his colleagues have, over the past twenty years, created some of the outstanding examples of upland improvement in Britain on notoriously difficult land.

Could not his problem, and that of thousands of other sheep farmers on less difficult uplands, be resolved by taking breeding sheep off the land in the winter months and keeping them in some appropriate form of housing? This is being done very successfully in the case of ewe hoggs by a number of hill farmers who have found off-wintering of these sheep to be prohibitively expensive. The suggestion is that this principle should be extended to breeding ewes, and the success that has attended this practice with lowland flocks encourages one to think that in-wintering of ewes could have a much wider application and make a very big difference in our approach to the handling of much of our uplands.

The advantages

The apparent advantages would be:

(*a*) Because the need for winter hardiness would be removed, it would be possible to run a more productive ewe and also to keep ewes to greater ages, thereby reducing the cost of flock replacement. One could think in terms of a wool clip of 5 lb and of 125 per cent lambing.

(*b*) This higher productivity would, in its turn, justify expenditure on the improvement of the upland grazings by surface draining, liming, slagging and, above all, closer subdivision to get a better control of grazing management. The outcome would be heavier summer carrying capacity and a better quality of lamb.

(*c*) The hazards of severe winter losses would be minimized because sheep would have protection from storms. In consequence farmers could plan with greater confidence.

(*d*) There could be a greater intensity of winter shepherding, and with it an economy of labour, for one man can comfortably look after as many as a thousand ewes when they are housed conveniently close to supplies of fodder.

(*e*) The wintering house could be used for the autumn finishing of store lambs on hay and cereals to reduce the uncertainty of store realizations, and to increase the total income of the farm.

The traditionalists will say that this will destroy hardiness and reduce hefting instincts. This is true, but the system will not demand these qualities. Subdivision introduces at an earlier stage of their lives a style of grazing management that cast-for-age hill ewes eventually meet when they come down to the lowlands.

Based on in-bye land

The aim would not be a *blitz* improvement of the upland grazings but gradual surface improvement concentrating on those areas of an enclosure most amenable to improvement. Separate enclosures would allow for preferential treatment of older sheep or those suckling twins. It would also allow for the judicious concentration of cattle so that they may be used in their primary role on the hills-pasture improvement.

The general plan would be to use in-bye land primarily as a source of winter fodder, either hay or silage, and if the area is insufficient relative to the size of the hill, winter fodder could be supplemented by the purchase of hay and corn at the cheapest time of the year. The ewes would be on

Professor M. McG. Cooper, B.Agr.Sc., B.Litt., F.R.S.E., Dean of Agriculture at the University of Newcastle upon Tyne, is also Director of the University's Cockle Park Research Farm. A well-known writer and speaker on agricultural subjects, his progressive outlook and the lively way in which he expresses his views have established his reputation far beyond the confines of the University —indeed, far beyond the bounds of this country.

the hills only from May to the end of November, when they would come on to the husbanded in-bye foggage for mating in December. Lambing would take place in late April and early May, using the wintering sheds as a base, and ewes and lambs would go out on to the rested hill grazings as soon as possible after lambing. Every precaution would be taken to protect the in-bye land from poaching and over-grazing in the winter and early spring, for its main function would be to provide supplementary winter feed.

Simple housing

The housing adopted need not be elaborate. A corrugated iron or an asbestos clad pole barn with a partly open south side, fitted with movable slatted floors, need not cost more than £5 per ewe, and even this figure could be reduced if bracken or straw were used for bedding instead of slats. There would, of course, have to be additional investment in fencing and improvement measures, but one would not contemplate a total investment figure exceeding £10 per ewe. Compare this with the Forestry Commission

investment of £40–50 per acre on comparable land which requires a corresponding number of years before there is a real return on the investment. The investment for sheep farming would give a return in its first year and this would increase as the improvement of grazings progressed.

It could be tried out

This thesis is not put forward as a working proposition to be adopted widely as a panacea for the problems of upland farming, for it has yet to be tested in practice. There is, however, sufficient evidence to suggest that there is a justification for a controlled case study, perhaps on a special Husbandry Farm, to determine its feasibility. Our experience with in-wintering of ewes on the University's farms has convinced us that so far as heavy soil, lowland conditions are concerned, the method has very great promise. It seems logical to us that it should be tested under conditions where the winter is even more demanding.

Bagging and Labelling Seed Potatoes

New regulations for the trade in seed potatoes (The Seed Potatoes Regulations 1963) applying to England and Wales will come into force on 15th November, 1963.

The Regulations introduce two important new provisions: (1) seed potatoes, whether certified or uncertified, that have been cleaned and dressed for sale may be delivered to a buyer only if they are packed in a permitted container, and (2) each container must be labelled or branded with information about the seed potatoes it contains (e.g., their size and variety); and, for certified potatoes, with an official code number indicating the farm on which they were grown.

These provisions are aimed at preventing the admixture of seed potatoes, safeguarding them against infection and disease, and ensuring that the buyer receives detailed particulars about them on delivery. The buyer will then be able to check what has been sent against his order, and can, if necessary, trace the farm on which certified potatoes were grown.

The seller is also required to give the buyer, within ten days of sale, or delivery, a sale note repeating most of the particulars shown on the label or bag and including details of the manner, if any, in which the seed potatoes have been treated against pests and diseases or with a sprout depressant.

MARKETING TODAY

It is useless for farmers and growers to think of entering the markets of today with the ideas of yesterday. Bryan Platt, Surrey farmer and broadcaster, puts the case for co-operation

A Farmer in Business

Bryan Platt

As a farm manager, I have found my work both stimulated and hampered by tradition. Anyone with the barest knowledge of agricultural history must be inspired by the record of British supremacy in crop husbandry and livestock improvement through the centuries. This legacy acts as a spur to further endeavour.

But agriculture is inevitably unique among industries, in that it is fragmented into thousands of small production units all of which, in the past, have sold their individual produce, and purchased their requirements, on a local basis. From time immemorial farmers have tilled the soil and tended their flocks for their own families and their immediate community; it is only since the Industrial Revolution and the growth of vast centres of population that farmers have begun to produce almost exclusively for the market.

Selling from strength

Social, economic and technical conditions have changed, but the tradition of expecting the public to buy everything that is produced, whatever its quality, persists. This is the tradition which hinders my management, and it was in

an effort to overcome my weakness as an individual seller, surrounded by buyers of mounting strength and efficiency, that I first turned to agricultural co-operation.

As soon as I joined forces with other producers in the sale of my goods, I began to achieve some parity with those distributors, wholesalers, retailers and processors who subsequently handled my goods. For the first time I was able to bargain from some position of strength. Milk, the major commodity I had to sell, was an exception, of course; this had long been covered by a marketing board. It does not matter to me what form co-operation takes—statutory board, society, syndicate, association or company—so long as it is genuinely what it sets out to be.

Forms of amalgamation can be very varied. One farmers' company with which I am associated was established as a grading service for a few neighbouring fruit farmers who, individually, could not afford the high cost of grading and packing equipment; nor could they individually achieve a volume of production demanded by the modern market. In 14 years this organization has grown into the largest fruit packing station in the world, and, under its own brand name, markets no less than one quarter of the entire British crop of apples and pears. On this scale, growers can certainly bargain from strength, and advertising is warranted.

On a more modest scale, the Land Settlement Association is a fine example of the commercial value of pooling resources by groups of small producers. Individually, men with five acres of market garden and a few livestock are finding it progressively more difficult to earn a living; collectively, one estate in the L.S.A., with over a hundred members, obtains an average annual net income of £1,300!

Wind of change

Countries, such as Denmark and the Netherlands, whose national economies depend on agricultural exports, have long appreciated the advantages of co-operative effort, and producers willingly accept the disciplines involved. A similar situation exists among growers along the Pacific seaboard of America, where goods have to be moved thousands of miles to the high population areas in the east. Why should co-operation be more readily accepted in these countries than in its birth-place, Britain? The reason, surely, lies in the necessity for these farming communities to fight for their markets; only large quantities of uniform, top-grade, well-presented goods, guaranteed under a brand name, are worth the high cost of transport.

In Britain we have until now enjoyed the luxury of a ready-made market just beyond our farm gates. That situation is changing rapidly under the influence of supermarkets, chain stores and facilities for importing a larger range of produce. Multiple stores are powerful buyers; it is essential for the continuation of their efficient businesses that they receive constant supplies of standardized goods, and they have indicated their willingness to by-pass home producers if their requirements cannot be satisfied from British sources. Our industry, too, has now to fight for its markets.

Food prices must be competitive

Food, however fine, will fail to find a buyer if it is uncompetitive in price. As a farm manager, I have to seek every opportunity of reducing my costs of

production. Most of my expenses are on labour, and the purchase of feeding-stuffs and fertilizers. How can this expenditure be reduced?

Like other farmers, I have replaced men by machines. As an industry, we spend £70 million a year on new machinery and twice that sum on keeping it in repair. But is not the history of most agricultural tools one of long, idle vacations followed by periods of intense activity? Far too many implements lie gathering cobwebs in the cartlodge for fifty weeks of the year; far too many barns and silos remain half-filled; far too much capital is vested in expensive grain drying and storage installations on every arable farm. I have found that lowering the percentage of mechanization costs in the total farm expenditure can have a very significant bearing on net profits.

It is possible, however, to achieve the same ends in labour economy by the evolution of systems on individual farms—or groups of farms—whereby a greater return can be obtained from each machine. This is the principle of the machinery syndicate—the sharing of a hedge-cutter between two or three neighbours, or of silos and drying plant for many hundreds of acres of corn.

Plenty of scope

But could not the idea be extended? Why shouldn't neighbouring groups of dairy farmers erect a cottage and employ a mutual relief milker? In tackling the problem of disposal of farm effluents, could not several farmers combine to install their own purifier where their ditches meet the main water-course or, for the conservation of water, to excavate communal reservoirs? Many small-farm communities on the Continent carry this principle of sharing production costs one stage further; to look after all their interests, they jointly employ experts to deal with specialized jobs such as spraying, pruning, harvesting and, indeed, management itself.

With intensive livestock production, I have also to consider the cost of fertilizers and feedingstuffs and, as with marketing, I have been conscious of my loss of bargaining power as an individual. Once upon a time, the local family miller supplied me with all my requirements and accepted my grain at harvest time to offset my debts. Now, the number of suppliers is rapidly dwindling, and the volume of trade—and therefore the strength—that each commands, grows every week. There is nothing wrong in this (it is the trend in modern business) but a dangerous situation arises if the industry fails to organize its resources to buy from an equal position of strength. Collectively, we buy £800 million of raw materials every year.

I began buying all my requirements through my local Society many years ago, mainly because I was convinced that co-operatives were doing more than merely assuming the mantle of the departing corn merchants. I was supplied not only with service, advice and credit where necessary, but I participated in the only collective means at my disposal to buy in bulk and avoid a situation in which I, as an individual farmer, could be held to ransom by the massed strength of my suppliers.

Integration all along the line

There is a more urgent and impelling basis for my belief that British agriculture needs to adopt co-operative principles. No longer can the production of any commodity be haphazard. Eggs and bacon, meat and

Interior of a new co-operative compounding plant with a throughput of 4,000 tons a month. All cereals are purchased from members of the Society

mushrooms, corn and cauliflowers, all must be planned in quality, quantity and timing of entry on to the market. There has to be a tight liaison between all the links in the long chain of events which composes marketing: research, production, grading, packing, presentation, advertising, distribution and retail selling. Producers have to accept the need for integration.

No efficient, orderly marketing is possible without such closely-knit organization. It fits into the modern pattern of buying. It provides the producer with a regular income and the consumer with a confidence that actively adds to the value of food purchased—a confidence which, with modern techniques of food preservation, guarantees a standard quality at a reasonable price all the year round. Unfortunately, this interrelation in the processes of food production also lends itself to vertical integration—the control of farming by financial concerns with primary loyalty to share-holders rather than producers.

This is no empty phrase. In America, where outside interests have seized control of the livestock and horticultural industries, 100 per cent of all broilers, 95 per cent of hatching eggs, 75 per cent of turkeys and 60 per cent of all fruit and vegetables are produced under contracts of diminishing benefits. The Government in Canada was forced to intervene to safeguard producer interests in a similar situation that was developing there. Farmers were fast losing control of their own holdings, and feedingstuffs firms, hatching companies and investment trusts were taking over the legitimate business—and profits—of primary producers. It seems to me that the only alternative to domination is co-operation, and that producers in every field must amalgamate their resources to retain the maximum returns to the industry.

I would go further. I believe the time is opportune for all producer-organizations—marketing boards, co-operatives, associations and companies—not only to take active steps to help their members in cutting costs by buying in bulk and selling large quantities under the guarantee of brand names, but also to branch out into the highly competitive fields of distribution.

This is precisely what the massive co-operatives in America and South Africa are doing. These organizations were established by producers who were prepared to raise the capital for processing their own produce, and accepted responsibility for it all the way from orchard to kitchen table. They have achieved economic security. And the quest for that independence is virtually the story of agricultural co-operation.

Modern concept

As a practical farmer concerned for my right to independence and the profitability of my farming enterprises, I accept the need to share my resources and my responsibilities, and to bulk my supplies and production. This, to me, is not merely the road to better business; in the future it may be the only route to survival. Circumstances govern actions. To succeed as businessmen, British farmers and growers, with their unparalleled skill as producers, must learn to differentiate between the tradition of good husbandry which will always apply, and the tradition of individualism which has no place in the modern commercial world.

The Author of this article manages a group of farms at Dorking, Surrey. He is a member of the Agricultural Central Co-operative Association's Publicity Committee and is Chairman of the Surrey N.F.U. Publicity Committee. Last year Mr. Platt won a 'Fison' award for agricultural journalism.

National Power Farming Conference Competition

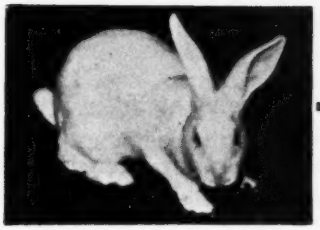
The Committee of the National Power Farming Conference announces an essay competition for young farmers. This will be held yearly and will be open to anyone under 30 years of age who is actively engaged in farming in the British Isles. The winner will receive £50 in cash and a challenge cup, which he will retain for a year. In addition, all expenses will be paid for him to attend the Conference and present his paper from the platform.

This year's subject will be 'Maintaining Farm Profits'—the theme of the next Power Farming Conference, which will be held at Harrogate on 12th and 13th February, 1964. Full particulars and entry forms can be obtained from the Organizer, National Power Farming Conference, Dorset House, Stamford Street, London, S.E.1. The closing date for entries is 30th November, 1963.

Broiler Rabbits

There could be a future for broiler rabbits if the costs of production were brought into line with the market price, says

R. F. R. Glanville



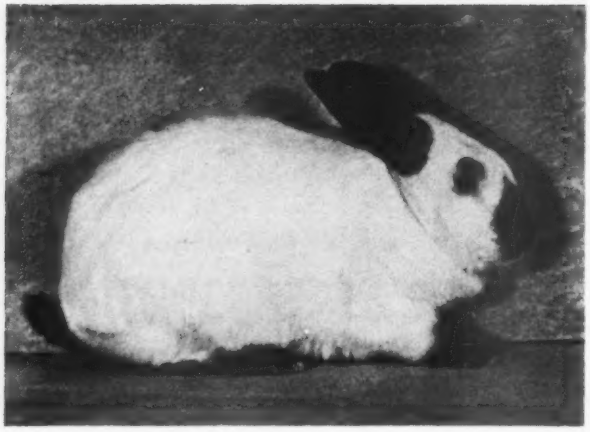
To many, the expression 'broiler rabbits' will conjure up a vision of a large building full of young rabbits running happily in all directions, this being the type of environment in which broiler chickens are usually met. But the rabbit is a mammal, and for the first few weeks of its life is inseparably bound to its mother. This means that the large-scale proliferation generally associated with broiler chickens is quite out of the question for the rabbit. The doe and her litter must be the basic unit. The broiler breeder hen can, in theory, be the mother of 150 or more progeny in a year, but the doe will do well if she produces one-quarter of that number. (Whoever coined the phrase 'breeding like rabbits' had not heard of the modern hen!) The hen also has the advantage that she can evade most of the cares of parenthood; for the doe there is no such easy way out.

The fact is that the doe must be treated as an individual, and that she and her family must be housed and managed in separate units. Experiments in running breeding does together in groups of much more than twenty or so have failed. This is the sort of thing that has largely prevented the broiler rabbit from becoming as popular as the broiler chicken.

Industry at the cross-roads

Broiler rabbit meat is very different from that of wild rabbits—often tough and sometimes full of shot. It is not generally considered a luxury article, yet the price it commands may be as high as 5*s.* 6*d.* per lb. This compares favourably with the price paid for many grades of red meat and, indeed, for that for broiler chicken; a high meat-to-bone ratio may be responsible. The demand appears to be greater than can well be satisfied for some considerable time.

At the moment the industry is at the cross-roads. Many who went into it two or three years ago have retired discouraged, having found it impossible to produce the rabbits at a price which the public is prepared to pay. The problem before the industry is therefore how to reduce the costs of production



A Californian doe. Such rabbits reach about 3½ lb at eight weeks. Their skins, properly prepared and in top condition, may fetch as much as 1s. each

so as to leave a reasonable profit margin. Work is going ahead in several directions.

A lot of excellent, but unnecessarily elaborate, housing equipment is already on the market—at quite uneconomic prices. Typical is a hutch with wire floor and semi-automatic cleaning, costing as much as £7 per doe. Fortunately, because it is endowed by nature with a built-in fur coat, the rabbit does not demand an elaborate home. Simple but efficient units costing no more than £5 per doe for house and hutch are now being produced. For reasons of disease prevention, wire floors were at one time generally favoured, but they are less popular now. Some trouble has been encountered with sore hocks, but this may be partly a genetic problem. Solid floor hutches have their enthusiasts, who claim, rightly enough, that they do not have this sore hock trouble. To balance this, however, cleaning out can be quite a problem, for unless sanitation is carefully watched, disease can cause serious losses.

Breeding the right rabbit

On the breeding side, work is largely conditioned by the preference that exists in the fur market for a white skin. This may fetch up to 1*s.* as opposed to 4*d.* for a coloured one. How important this is may be gauged by the fact that the price of the skin frequently represents the extent of the profit margin to the processor.

So most attention has been paid to such breeds as the Californian and the New Zealand White, although the albino Dutch and the big French Géant Blanc have also been used, as well as some crosses between them. In this way improvements are expected to be made in litter size and frequency, growth, and conversion rates. Up till now it has to be admitted that experiments in this direction have been disappointing. At present the New Zealand white, because of its quicker growth rate, appears to be slightly preferred to the Californian, despite the latter's higher killing-out ratio. On the other hand, the Géant Blanc is being used in an experiment to keep the rabbits to sixteen weeks, as against the usual eight. It is hoped that such rabbits may ultimately weigh as much as 10 lb at this age.

The objective is clearly to spread the overheads of maintaining the breeding stock over a greater weight of rabbit. But young rabbits will

require a considerable amount of food during the additional eight weeks. Perhaps the most serious objection is that market research shows conclusively that the public prefers a smaller rabbit.

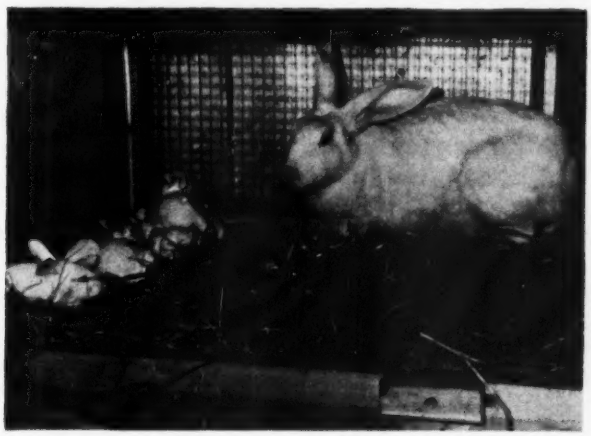
Because of the great success of broiler chickens, many people went into broiler rabbits with the idea of making the same large profits. To meet the demand, a large number of breeding rabbits were sold which were quite unsuitable for the purpose. The wrong colour, slow maturity with a poor conversion rate, a bad killing-out ratio, a low proportion of meat to bone, small litters widely spaced—all these were faults found in much of the stock sent out. As a result, many people were unable to make any sort of profit and have left the industry as quickly as they went in.

Feeding is expensive

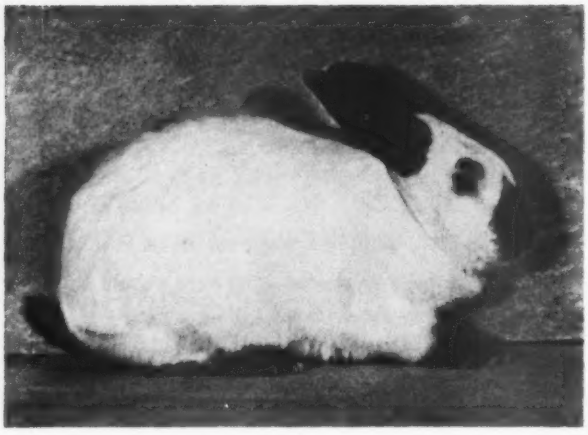
The high cost of feeding is another aspect which is receiving a great deal of attention. Because of the relatively small amounts used, the price of rabbit pellets remains high compared with those used for poultry. Increased consumption may go some way towards solving this problem; nevertheless concentrates account for a large slice of the costs of production. By contrast, foodstuffs grown on the farm, such as hay and kale, are bulky and expensive in labour to use, while supplies are liable to be affected by adverse weather. Experiments are being planned employing modern grass-conservation methods and such things as silage and pelleted hay. Perhaps because, as is still the case in France and elsewhere, rabbits have been regarded as a cottage industry, the amount of food that can be consumed on a modern rabbit farm comes as something of a shock. A recent calculation on a farm with some 300 does showed that they and their followers could, in the course of a year, demolish about 100 tons of silage! Some breeders still use Morant-type fold units, which take the rabbit to the grass instead of the other way round, but there are considerable risks of disease. Coccidiosis, though controllable by the use of drugs or, to some extent, by wire floors, is still the cause of far too many livers being rejected at the killing stage.

Co-operation in marketing

In an effort to reduce the costs of marketing and to ensure a more uniform product, many producers are combining to market their rabbits. A large



Géant Blanc doe, with litter. A good specimen of the breed



A Californian doe. Such rabbits reach about 3½ lb at eight weeks. Their skins, properly prepared and in top condition, may fetch as much as 1s. each

so as to leave a reasonable profit margin. Work is going ahead in several directions.

A lot of excellent, but unnecessarily elaborate, housing equipment is already on the market—at quite uneconomic prices. Typical is a hutch with wire floor and semi-automatic cleaning, costing as much as £7 per doe. Fortunately, because it is endowed by nature with a built-in fur coat, the rabbit does not demand an elaborate home. Simple but efficient units costing no more than £5 per doe for house and hutch are now being produced. For reasons of disease prevention, wire floors were at one time generally favoured, but they are less popular now. Some trouble has been encountered with sore hocks, but this may be partly a genetic problem. Solid floor hutches have their enthusiasts, who claim, rightly enough, that they do not have this sore hock trouble. To balance this, however, cleaning out can be quite a problem, for unless sanitation is carefully watched, disease can cause serious losses.

Breeding the right rabbit

On the breeding side, work is largely conditioned by the preference that exists in the fur market for a white skin. This may fetch up to 1*s.* as opposed to 4*d.* for a coloured one. How important this is may be gauged by the fact that the price of the skin frequently represents the extent of the profit margin to the processor.

So most attention has been paid to such breeds as the Californian and the New Zealand White, although the albino Dutch and the big French Géant Blanc have also been used, as well as some crosses between them. In this way improvements are expected to be made in litter size and frequency, growth, and conversion rates. Up till now it has to be admitted that experiments in this direction have been disappointing. At present the New Zealand white, because of its quicker growth rate, appears to be slightly preferred to the Californian, despite the latter's higher killing-out ratio. On the other hand, the Géant Blanc is being used in an experiment to keep the rabbits to sixteen weeks, as against the usual eight. It is hoped that such rabbits may ultimately weigh as much as 10 lb at this age.

The objective is clearly to spread the overheads of maintaining the breeding stock over a greater weight of rabbit. But young rabbits will

require a considerable amount of food during the additional eight weeks. Perhaps the most serious objection is that market research shows conclusively that the public prefers a smaller rabbit.

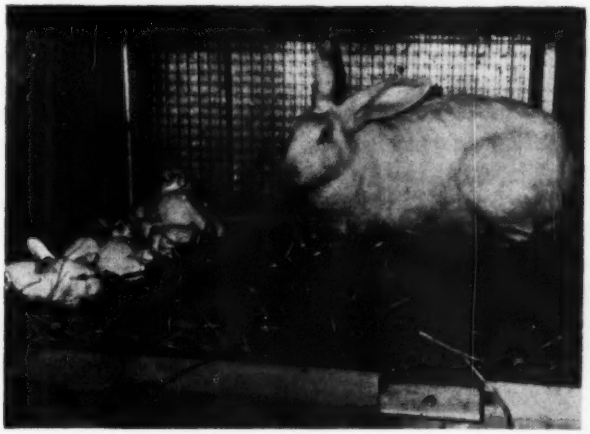
Because of the great success of broiler chickens, many people went into broiler rabbits with the idea of making the same large profits. To meet the demand, a large number of breeding rabbits were sold which were quite unsuitable for the purpose. The wrong colour, slow maturity with a poor conversion rate, a bad killing-out ratio, a low proportion of meat to bone, small litters widely spaced—all these were faults found in much of the stock sent out. As a result, many people were unable to make any sort of profit and have left the industry as quickly as they went in.

Feeding is expensive

The high cost of feeding is another aspect which is receiving a great deal of attention. Because of the relatively small amounts used, the price of rabbit pellets remains high compared with those used for poultry. Increased consumption may go some way towards solving this problem; nevertheless concentrates account for a large slice of the costs of production. By contrast, foodstuffs grown on the farm, such as hay and kale, are bulky and expensive in labour to use, while supplies are liable to be affected by adverse weather. Experiments are being planned employing modern grass-conservation methods and such things as silage and pelleted hay. Perhaps because, as is still the case in France and elsewhere, rabbits have been regarded as a cottage industry, the amount of food that can be consumed on a modern rabbit farm comes as something of a shock. A recent calculation on a farm with some 300 does showed that they and their followers could, in the course of a year, demolish about 100 tons of silage! Some breeders still use Morant-type fold units, which take the rabbit to the grass instead of the other way round, but there are considerable risks of disease. Coccidiosis, though controllable by the use of drugs or, to some extent, by wire floors, is still the cause of far too many livers being rejected at the killing stage.

Co-operation in marketing

In an effort to reduce the costs of marketing and to ensure a more uniform product, many producers are combining to market their rabbits. A large



Géant Blanc doe, with litter. A good specimen of the breed

A modern rabbitry at Tring, Herts

number of such producer-controlled rabbit groups exist on a co-operative basis, selling their produce to a relatively small number of processors. These usually buy on a live-weight basis, deductions being made for defects such as coloured skin or damaged livers. The price paid is often the same as that which the processor himself receives for the carcass. He depends for his profit on the sale of the by-products—mainly the skin. A good killing-out percentage is also important. A result of this system is that the producer is encouraged to keep the right kind of rabbit. One packing station is proposing to pay a bonus on Californian rabbits next year because of their better killing-out characteristics. Such groups may also act as purchasing agencies and, by bulk buying of such things as food and appliances, they are able to secure major economies for their members. They also act as an exchange for information, advice and help.

Summed up

To sum up, the broiler rabbit industry is striving within the limits imposed on it by nature to find ways of meeting at an economic price a demand which at present far exceeds its capacity. To this end, the appliance manufacturers are developing simpler, but no less efficient, housing. Breeders are striving to produce the right kind of rabbit, and nutritionists are trying to strike the right balance between expensive concentrates and labour-consuming bulk foods. Small producers are uniting to form groups for the purpose of more efficient purchasing and marketing; and the larger ones are improving their techniques. If, through their various activities, the costs of production can be brought into line with the market price, then the future for broiler rabbits is bright.

R. F. R. Glanville, N.D.P., has been Poultry Advisory Officer for Buckinghamshire in the N.A.A.S. for the past 2½ years. His duties cover not only poultry but also rabbits and other small livestock, such as chinchilla, mink and goats. Before going to Bucks, he was for 10 years a Poultry Advisory Officer with the Northern Ireland Ministry of Agriculture.

F. G. CLEGG

of the Ministry's Veterinary Investigation Centre, Sutton Bonnington, Leics, advises

Caution with Kale and Rape

Kale and rape are important standby crops for winter feeding of cattle and sheep but there are dangers if they are fed to excess

As every livestock farmer knows, kale is an important winter feed—rich in protein and carotene and particularly valuable at a time of year when it can offset these deficiencies in hay, straw and cereals. But it is not so widely known, I think, that excessive feeding or unbalanced feeding of kale (and rape) can cause serious illness, even death, of cattle and sheep.

Perhaps of more importance is the fact that there may be a general loss of condition of a whole dairy herd or group of fattening animals. Although milk production may at first appear to be stimulated by kale feeding, a later loss of condition and infertility may ensue. A similar problem in cattle may follow excessive feeding of cabbage or Brussels sprout plants (also brassica).

Kale anaemia

During the war-time scarcity of protein foods in Germany, large quantities of kale were fed to cattle, and the illness which sometimes resulted was called 'kale anaemia'. Any variety of kale can cause this. In the early stages the red blood cells are quickly destroyed, and the urine becomes discoloured by broken-down blood pigments which are being excreted. This form of urine discoloration is known as haemoglobinuria.

Usually the urine is of a red-brown or mahogany colour, but if illness is severe the urine may look like black coffee. The animal becomes anaemic, with pale mucous membranes, and in a milking cow the skin of the udder will be found to be unnaturally white. Even up to this stage a cow will continue to milk well and if she has recently calved she may be giving a fair yield.

If, however, the breakdown of the red blood corpuscles has been too great destruction of liver tissues follows and jaundice supervenes.

A severely ill cow will, at this stage, show yellow discoloration of the white skin of the udder and of the mucous membranes. The heart sounds may be so loud and drum-like that they can be heard several feet away. This abnormal heart action is an attempt to maintain oxygenation despite the reduction in the number of the red blood corpuscles. The outlook is then serious and death soon follows. Post-mortem examination shows evidence of jaundice with a golden yellow coloured liver, kidneys a cocoa brown colour, and the bladder containing black tarry urine.

Examine the herd

The presence of even one case of haemoglobinuria in these circumstances, even though it may be transient, suggests that other cows receiving the same diet may be anaemic. A rapid loss of condition may follow in these other cows and infertility can become a problem. Cows which are heavily in calf or recently calved are much more likely to become severely anaemic and acutely ill due to physiological changes occurring at this time.

Anaemia and jaundice in sheep which have been fed kale for several weeks has been reported and the condition appears to resemble that found in cattle.

Anaemia and haemoglobinuria have been reported in cattle from other European countries following gluts of white cabbage. This has occasionally been described in England when young stock have been fed excessively on cabbage with no hay or concentrates. The same condition has been seen when cattle have been used to clear up Brussels sprout plants after picking.

But the danger of feeding kale should not be over-emphasized. It is a potentially high-yielding nutritious fodder crop which appears to stimulate milk production. And it is just because of this that there is a tendency to overfeed the crop during the relatively short period it is available and before it is damaged by frost. The increased use of nitrogenous fertilizers and resulting heavier yields, together with the drive towards cheaper milk production, may be additional reasons for more cases of kale anaemia to occur than previously. Feeding too much kale must be avoided, especially in pregnant and recently calved animals. This can be done by feeding a balanced ration including hay and cereals.

High calcium, low phosphorus

An illness described in many parts of the world affecting cows after calving is known as post-parturient haemoglobinuria. The disease process is essentially the same as in kale anaemia, but it is associated with diets low in phosphorus. In the United States post-parturient haemoglobinuria has occurred on diets of lucerne and beet pulp when unsupplemented by concentrates, and the condition has been found in Britain on diets of predominantly hay and sugar beet pulp.

Kale is notoriously rich in calcium and low in phosphorus. The calcium/phosphorus ratio is wide, so that unbalanced feeding of kale results in high calcium intake together with a low phosphorus intake. It may even be that the phosphorus supplied is insufficient or barely sufficient for the requirements of a high-yielding cow, or one which is laying down bone in the developing foetus.

The immediate cause of the destruction of the red blood corpuscles in kale anaemia is not known, although several factors have been suggested. Certain toxic agents may be responsible, perhaps similar to the volatile oils in mustard. Nevertheless it is unwise to have an uncorrected mineral balance in heavily milking and pregnant animals, and excessive kale feeding must be avoided at these times. If the other dietary constituents do not provide adequate phosphorus, I would suggest the addition of a phosphorus-rich mineral during the kale season. As soon as the kale is discontinued the phosphorus supplement should also be stopped. The semi-liquid nature of rumen contents of kale-fed cows suggests the value of good hay fibre.

Kale anaemia may appear shortly after frost, perhaps the first frost of the winter. This may be only a precipitating factor, as the consumption of 40–60 lb of frozen material, forming a cold mass of sloppy kale in the animal's rumen, may be a further strain for animals already anaemic. It may be wise to restrict kale feeding on frosty mornings or to wait until the day becomes warmer.

Dangers with rape

Troubles caused by feeding rape to cattle and sheep are world-wide, and many and various disease conditions have been attributed to it. Digestive disturbance, due to gorging, may follow soon after turning on to the crop. Pulpy kidney losses may occur as on rich grass, but an enterotoxaemia vaccination programme will prevent these deaths. Haemoglobinuria due to the breakdown of red blood corpuscles happens at other times, as in kale anaemia. Nervous symptoms in sheep, with blindness and violence, are also known. Introducing sheep gradually to the crop will help to prevent trouble. The use of a run-back of old pasture allows the sheep to graze and start to feed on the rape slowly and provides them with a dry bed instead of wet, muddy conditions underfoot. This old pasture, or the addition of hay, will supply some badly needed fibre.

Quite apart from the disease problems mentioned, bloat may occur in cattle on both kale and rape. In some years bloat on kale can be a problem, and this is usually of the frothy type and intractable to treatment. Climate may play a part here, but the lack of roughage would be conducive to bloating on both crops. Both kale and rape will taint milk and it may be wise to feed them after milking; tainting due to rape may be quite unpleasant.

Kale and pregnant animals

The long-continued feeding of kale to pregnant animals has been blamed for the occurrence of goitre in lambs and calves, a disease which involves gross enlargement of the thyroid glands. The reason for this tendency may be due to the low iodine content of the plant, but it is also known that substances inhibiting thyroid activity are present in kale and some other plants. In certain parts of the world the possibility of these substances being present in milk from kale-fed cows has received attention. This is because of a concern that these substances would then produce changes in the thyroid glands of children.

These two crops are valuable and nutritious and if used sensibly and not fed to extremes they have an important place in the feeding calendar.

Mr. Roland Dudley, *still active at 84*

He made machines work for him

the story of Roland Dudley

Ralph Whitlock

ROLAND DUDLEY bought his 2,000-acre estate at Linkenholt, on the high central area of the Hampshire downs, where the counties of Hampshire, Berkshire and Wiltshire meet, purely for its sporting amenities. This was in 1926, and he agreed with a suggestion that the vendor's bailiff should continue to farm it for him.

Off went Mr. Dudley to winter in Egypt, and returned in due course to find the farm torn by disputes and squabbles and many of the beautiful flock of Suffolk sheep dead. He forthwith sold all the livestock, let the farm and determined, after this first disastrous encounter, to wash his hands of farming. He let the estate to a tenant.

Mr. Dudley was a trained engineer, holding the degrees of A.M.I.C.E. and M.I.B.A.E., and his early career lay with the Admiralty. At this time, incidentally, he became a fully-qualified diver, as was necessary for all civil engineers in this sphere. Later he was associated with the family business of the Somerville-Barnard Construction Co. Ltd., which specializes in structural engineering. He is still its Chairman.

The pattern set

It was as an engineer and through his interest in machinery that, shortly after his farming debacle, he got into conversation with an American agricultural expert whom he met in Switzerland. This technician was returning to

India to assist Indian farmers in mechanizing their agriculture, which prompted Roland Dudley to exclaim, 'Why go to India? There's plenty of scope for you in Britain!'.

The American had mentioned the combine harvester, then a new machine in his country, and this struck Mr. Dudley as the very thing he needed at Linkenholt. He returned to England determined to have a second go at farming, this time on his own account and with the aid of intensive mechanization.

In the meantime the Oxford University Agricultural Advisory Committee had brought over from the United States the first combine harvester to work in this country. It was tried first of all on Mr. J. Magg's farm in Wiltshire and then at Winchester, where Mr. Dudley saw it. He promptly bought it for Linkenholt.

This combine harvester, a Holt, proved a sound investment, for it ran for twenty years and was only recently scrapped. Mr. Dudley lists as one of its great advantages a self-levelling device which is not found in any modern machine. There were, however, many adjustments to be made, notably with the sieves, and Mr. Dudley added a pick-up reel, which was his own invention.

New ideas

The grain of the first harvest came out half wet and half dry, according to the vagaries of the weather, so Mr. Dudley bought a grain drier, probably the first in England. Profiting by experience, he later pulled this out and rebuilt it, meantime mechanizing every farming operation as fully as possible.

So, all through the depression and the lean 'thirties, when farmers all round him were going bankrupt and when most chalk downland similar to his was being allowed to fall derelict, Mr. Dudley persevered with his experiments. He had few supporters, but one of them was Professor E. S. Beavan, who was then breeding barleys at Warminster and who saw, even in those days, a great future for barley-growing on the chalk hills, combined with the

Linkenholt, on the Hampshire downs

mechanized farming which Mr. Dudley was pioneering. By degrees other farmers began to adopt his ideas, one of the most successful being Mr. John Rowsell.

On the outbreak of war in 1939, Mr. Dudley was immediately called upon to put his experience at the disposal of the country. Serving on the Hampshire War Agricultural Executive Committee as Vice-Chairman he gave unstinted service throughout the war years, occupying, among other posts, that of Chairman of a committee for contract threshing. His personal tragedy was that he lost both sons, the elder at a prep. school, and the younger, who had been all through the war as Company Commander in the Irish Guards, during the last few minutes of hostilities.

Linkenholt today

Since then he has continued his efficient farming, in recent years with the help of his gifted young manager of the Linkenholt estate, Mr. Brian Loxton. Here, at altitudes of between 450 and 900 feet, he grows annually over a thousand acres of grain, chiefly barley, 500 acres of grass and 559 woodland. The whole estate covers 2,059 acres. Most of the barley is grown for seed and malting; the balance is used on the farm, being fed to pigs, of which some thousand a year, the progeny of 70 sows, are sold at the cutter stage. Between 500 and 600 Greyface ewes and crosses, with their progeny, graze the productive leys. Other livestock on the estate consists of 3,500 laying hens and 100 beef cattle.

Nowadays Mr. Dudley tackles his harvesting with the aid of three 12-foot combines. He has lately interested himself with improving haymaking techniques. By using a crimper, he finds he can greatly reduce the time between cutting and baling his hay and he has devised a novel sled for stacking and transporting the bales, twelve at a time. Whilst the bales remain stacked in the fields to dry out, they are protected by plastic sheets.

Salute to a pioneer

So, even at the age of 84, Mr. Dudley retains an active participation in the agricultural improvements which stand as a monument to his life's work. Over the years sundry honours have rightly come to him. He has been Chairman of The Farmers' Club, President of the National Institute of Agricultural Botany (he is a Vice-President for life), and High Sheriff of Hampshire for 1941–42. In 1952 he judged implements at the Royal Show. He was also Chairman of a Parliamentary Committee appointed to find a humane rabbit trap, and was awarded the O.B.E. in 1958.

The highest commendation of his work, however, must be the almost universal adoption of ideas which he had courage enough to pioneer and for which he was once laughed at.

G. F. Aronson
of the Ministry's Legal Department

on the subject of

TRESPASS

AMONG the more misleading notices one sees displayed about the countryside is the one with which we are probably all most familiar. It announces simply: 'Trespassers will be prosecuted'. It may therefore come as a surprise to some to learn that, except in one or two special cases, trespass is not a crime in English law, but is merely a 'tort' (Norman-French for 'wrong').

What is the difference, anyway? A crime is an anti-social action considered by the State to be sufficiently serious to justify its own intervention by means of a prosecution brought in the name of the Queen on behalf of the whole community. If the accused is convicted, generally speaking he will be fined or imprisoned. But a successful prosecution does not normally result in the injured party being compensated for his injuries.

In tort, however, it is only the injured party who may take action, and his remedy consists in suing the wrong-doer in the civil courts for damages. Alternatively, or additionally, he may seek an injunction; that is to say, an order of the Court restraining the defendant from committing a similar tort in future. If the defendant then disobeys the injunction he can be 'attached' (or sent to prison for contempt of court).

Some torts are also crimes. Thus in one or two special cases, where the interests of the community have appeared to be at stake, the legislature has stepped in and made trespass itself a crime, e.g., trespass on railways and airfields, and trespass in pursuit of game—in other words, poaching.

Trespass or nuisance?

What exactly is trespass? It is any 'direct injury' to land, including a mere crossing of the boundary, since this must 'injure' the land, however slightly. It has been said that if the defendant places a part of his foot on

the plaintiff's land unlawfully, it is in law as much a trespass as if he had walked half a mile on it. Other things, like driving a nail into a wall, or placing rubbish against a wall, have also been held to be trespasses. But trespass must be distinguished from 'nuisance', which is an indirect interference with property rights. Examples of nuisance are the causing of unreasonable noise or stench, pollution of a watercourse by an upland riparian occupier to the detriment of his lowland neighbour, and withdrawal of an occupier's rights of support and of light.

Most acts of trespass are relatively unimportant and may cause little or no damage unless repeated. Nevertheless, trespass, unlike some other torts, such as nuisance just mentioned, confers on the occupier of land a right to sue for damages, even though there is no physical damage to which he can point. In such a case a court will usually award the plaintiff nominal damages of £2 and (what may be more important) the costs of bringing the action. However, if the occupier can point to actual physical damage which he has suffered in consequence of the trespass, such as trampled crops or broken fences, he will be able to recover the actual damage which he has sustained. (In nuisance he cannot bring an action at all unless he can prove actual damage.)

Although a farmer may be reluctant to go to the extreme of bringing an action in the courts, he may sometimes be driven to do so, either as a result of the cumulative effect of repeated acts of trespass on his land, or through fear of a legal right of way being established over his land against him by prescription (or long use). In such a case taking proceedings may not merely afford a salutary lesson to others who may be tempted to trespass; it will also preserve the value of the farm for the future.

Self-help

Apart from taking proceedings in the courts, is there anything else that an occupier of land can do in order to prevent trespassing?—Yes. Trespass is one of the relatively few cases (perhaps because of its very ancient origin) where the law allows the injured party to take the law into his own hands (or exercise the remedy of 'self-help' as it is called). If an occupier finds a person trespassing on his land he can physically eject him. But here is the rub—he must use 'no more force than is reasonably necessary'. How much force in any given case is reasonably necessary naturally depends on the circumstances. In general, a person who wishes to take the law into his own hands in this way would be well advised to begin with a polite request to the trespasser to leave the premises; to follow this with a more peremptory request; and only when all else fails to remove him physically, using the absolute minimum of violence. Anything more than a gentle frog-marching to the frontier is likely to be discountenanced by the Courts!

An example of the remedy of self-help may be found in the leading case, decided in 1893, of *Harrison v. the Duke of Rutland*. The Duke of Rutland was the owner of certain grouse moors over which he had shooting rights. The moors were intersected by highways, the soil of which belonged to the Duke, but over which the public had rights of way. Harrison, who appears to have been something of a crank—though whether his animosity was directed against the hereditary aristocracy or against blood sports, or both, the law report does not make clear—took up station on one of the highways, while the Duke and his friends were out shooting, and every time the grouse

flew towards the butts, waved his handkerchief and his unfurled umbrella —thus effectively scaring the grouse away. Thereupon the Duke's servants, at his behest, approached Harrison and (literally) sat on him until the shoot was completed.

In the subsequent action for assault brought by Harrison, the Court of Appeal upheld the Duke's contention that Harrison by his actions had become a mere trespasser on the highway and that the Duke was therefore entitled to use reasonable force to enable him to exercise his undoubted shooting rights.

This case is also authority for the proposition that although a person's entry on to the land of another may originally be perfectly lawful, nevertheless if he exceeds his legal rights he becomes no more than a trespasser.

Plant to a Policy

W. L. Hinton

NATIONAL ORCHARD

The apple acreage in England and Wales is approx. 160,000; pears 20,000. Three-quarters of the apples are table fruit; the dessert apple acreage slightly exceeds that of culinary apples; the remainder are cider apples.

Dessert apples dominate the apple production by value since the average sales per acre of this kind of fruit are more than double those of culinary apples. The contribution of cider fruit to total apple output is negligible; cider apples are worth only one-fifth that of culinary fruit per acre.

Perry pears account for 15 per cent of the pear acreage. Dessert pears (in value) account for 98 per cent of the pear output.

THE future profitability of our orchards lies in planning by individual growers—*now*. At the present time the bearing acreage of dessert apples is expanding, while that of culinary apples is declining. The bearing acreage of dessert pears is also expanding, while that of perry pears is shrinking. Similarly, production in volume of dessert apples is rising and, mainly on account of the high proportion of trees not yet in bearing (one-quarter), production will go on increasing until the 1970s. After that a significant proportion of the older plantations will be grubbed as they become uneconomic.

The present replacement rate of culinary apple trees is low. Today less than one in ten trees are under seven years old. This factor, plus the high rate of senescence of existing plantations, will cause the production of culinary apples to fall sharply over the next decade.

The outlook for perry pears is similar to that for culinary apples; and the future production pattern of dessert pears is similar to that of dessert apples. It is fortunate for the commercial grower in this country that demand expectations roughly coincide with the future pattern of the output; but fundamental to the future of the individual British producer is the plantation pattern of his own orchard.

Commercial orchard

Here, then, are lessons for the individual grower. In short, both the age and varietal structure of the commercial orchard are of paramount importance for those fruit farmers who wish to remain commercial. Not only must the level of output per acre be high—as reflected by the variety composition, the yield levels and the quality of fruit which an orchard can attain—but the replacement policy must be such as to keep production rising and so maintain or improve the commercial viability of the fruit farm. Some flexibility also must be built into the plantation policy of the commercial orchard; it must allow for the production of varieties for which demand will increase, while at the same time allow for the elimination of varieties for which demand will fall off.

Orchard layout and the size of tree must also provide for the more efficient use of labour and equipment. The lack of provision for research on this subject in the national programme of fruit experiments is a lamentable omission. Only on the few very large plantations can such investigations be carried out successfully by the grower himself. On this issue alone rests the future financial outcome of the majority of our fruit farms. In fact, half the production costs in orchard fruit production at the present time are represented by labour; and labour output can be augmented only by adequate mechanization. Labour rates, moreover, have increased by 60 per cent over the last ten years and, for all we know, they may rise by a similar amount in the next ten years.

The economic success of the orchard of today and more especially of the orchard of tomorrow is dependent on the use made of the grower's own land, labour and capital, and the plantation policy of the fruit farm is linked directly with all these factors.

Real cost of replacing orchards

On a fruit farm of 60 acres some 8–10 acres need to be given over to young trees if productivity is to be maintained by making due allowance for the replacement of old orchards. If no such provision is made the profitability of the farm may be in jeopardy, since the revenue of the business will decline much more than the fixed costs of maintaining the orchard business. Successful fruit farmers know that a satisfactory level of profitability can be maintained only by ensuring that fruit revenue is kept at a high level. The business turnover depends on the level of output per acre rather than on the mere size of the orchard enterprise alone.

For example, the 60-acre fruit farm in dessert apple and pear production with a comprehensive replacement policy may achieve a farm revenue of £300 per acre over the 50 acres of bearing fruit—a total revenue of £15,000. On such a farm, but where replacement is neglected, fruit revenue may drop to as low as £100 per acre and total farm revenue to £6,000, thus making the business as a whole uneconomic because the revenue is insufficient to meet the fixed costs of the farm and leave a profit.

Orchard replacement – an example

Outlay on orchard replacement is small in relation to the benefit given to the business by increasing its viability. This is illustrated in the following example, which concerns the establishment of a 10-acre orchard of dessert pears. Furthermore, the grower may charge this outlay to current account, without tax on his investment. He is in the fortunate position of being able to finance investment in young orchards out of the current profits of his business.

Outlay on Materials in Planting 10 acres of Pears

Item	*Quantity*	*Cost per Unit*	*Cash Outlay* £	*s.*
Muriate of potash	20 cwt	21*s.* per cwt	21	0
10: 10: 18 fertilizer	8½ cwt	17*s.* per cwt	7	5
FYM	35 tons	30*s.* per ton	52	10
Trees	1,320	5*s.* each	330	0
Stakes	1,320	8½*d.* each	46	15
Ties	110 doz.	10*d.* doz.	4	12
Total cost of materials for 10 acres			£462	2

Per Acre	£	*s.*
Cost of materials	46	4
Real cost of the outlay on materials until orchard is established —original outlay and compound interest over 7 years at 5 per cent	65	0

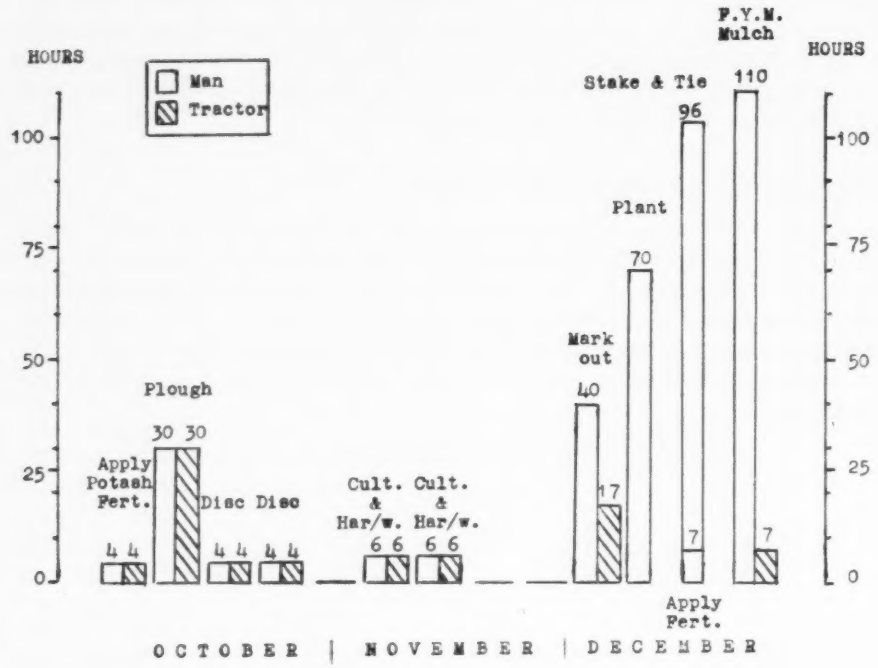
Further annual outlay on sprays and fertilizer is assessed at £36 per acre over the next six years (i.e., £6 a year). Total cash outlay in the seven years before the young orchard matures is £82 which, allowing for interest foregone, represents an outlay of some £110 per acre.

Orchard replacement creates a problem for the grower only in the year in which the planting takes place. In comparison with requirements in the season of planting, labour requirements for cultivations and pruning in successive years are low and may be coped with easily until the trees mature. The labour requirements for planting up the 10-acre pear orchard are shown below. It is evident that from October to December inclusive the demands on labour can well be met by the labour force normally available. Only the operations of staking and tying, and manuring and mulching take up the time of more than two men, and these operations could well be spread over more weeks if pressure on labour should make this necessary.

In addition to the labour available, any established fruit farm will have all the equipment essential for these operations, so that planting of a young orchard only involves the grower in real expenditure on the trees and materials.

PLANTING 10 ACRES PEARS 21½ft × 15½ft—1962

Labour Requirements



It may be contended that the labour requirements for planting up an orchard will interfere with the pruning programme, but surely there is plenty of scope over the winter season to include the operations of planting. A lighter pruning may be followed in the year in which planting takes place or the grower may decide to replace half the acreage of young fruit in one year. There is no need to plant up in a given year, but labour requirements are in fact so low that if the grower decides to carry out a planting programme he ought not to have any difficulty in fitting it in.

The example here given shows that on 10 acres the total variable cost of replacement is £1,100. Looked upon in isolation this is a big expense, but balanced replacement of trees means a difference in the revenue, per bearing acre, of at least £100, at a cost of £22 per bearing acre. The £100 or more per acre which this boost to the revenue represents is a good return on the outlay. Can growers afford not to make such an investment?

W. L. Hinton, M.A., B.A. (Com.), N.D.A., is Horticultural Management Liaison Officer in the Farm Economics Branch of the School of Agriculture, Cambridge.

Arabian stallion imported from Poland by the author

Horse Breeding on a Mixed Farm

by **Patricia Lindsay**

WITHOUT doubt, the breeding of horses brings more management problems and risks than those with any other type of livestock, but I believe it is possible to fit it into a mixed farm both conveniently and profitably. It is an attractive thought that the producer of light horses has a steadily growing demand at home and an important place in the export market.

Of course, the specialist Thoroughbred studs, large and small, are dealing with an extremely valuable product. Their costs and risks are high, but in a good year the returns are high too. Fluctuations in profit may be enormous. Their whole management system is geared to the benefit of the horses, which must be brought to maturity as quickly as possible. Where other livestock are kept, they are of secondary importance.

At the other end of the scale, all too many small breeders of horses and ponies are hampered by lack of land. This gives rise to many problems, not the least of which is deterioration of pasture through poaching and overgrazing by horses alone and then having to buy in expensive fodder. The enterprise is dependent upon uncommon skill or luck, if it is not to remain a rather costly hobby. Different again, is the case of the farmer with a couple of hunters or heavy brood mares included among his livestock.

My own experience falls between these extremes. I have always been deeply interested in the breeding of livestock, and also fond of riding and hunting and of various types of horses and ponies. I was drawn towards the Arabian breed because of its great beauty and refinement and because

of its centuries-old reputation for speed, endurance and intelligence. From the breeders' point of view, it has the irresistible attraction of a pure breed, established for several thousand years. This should eliminate at least a few of the hazards of breeding; some of the pure-bred foals may not reach the standard required of the breed, but at least all will show certain breed characteristics.

Starting as a hobby

I began breeding Arabian horses in a very small way as a hobby, grazing them on my father's farm when I had no land of my own. As, inevitably, the number of horses tended to increase, this state of affairs became unsatisfactory. But the foundations of my breeding venture had been laid and, when in 1958 I was lucky enough to acquire a neighbouring farm of 130 acres, the horses were transferred there as a going concern.

The position of Warren Farm, adjoining my father's land on three sides, was ideal, but there was a great deal to be done. I decided to concentrate on three enterprises based on grass: the Arabian horses, a beef herd producing single-suckled calves, and a small flock of Devon Closewool sheep. The foundation of the latter, 18 ewes and a ram, were acquired a week before I took possession of the farm, but I had to wait till the following April for my first heifers. About half the farm was let to my father and worked in his general rotation, since I had no labour or equipment for arable farming. But in the first couple of years the rent received was more than swallowed up by paying for the new permanent leys which went down on my part of the farm and for the work done on them.

Specialization: Pure-bred Arabians

About the time I bought the farm various changes were made among my horses. First, I decided to concentrate on the breeding of pure-bred Arabians, and my pony and part-bred Arab stock were sold. Secondly, I took a revolutionary step in importing Arabian stock from Poland—mares and fillies to begin with, and later a stallion. These were representatives of well-tried lines, which had been selectively bred in Poland from the original desert stock, in some cases for well over a hundred years. I took this step, both because I liked the qualities of the individual horses and their breeding (which I studied in detail), and in order to introduce fresh lines of blood to the English-bred Arabian stock. Having my own land, I could now gradually build up the numbers of horses, but at the same time I culled those which did not reach my own changing standards in various ways.

Most important to all horse breeders is to have productive mares, for it costs almost as much to keep an Arab or Thoroughbred mare during a wasted barren year as when she is suckling a foal. Obviously, good stud management and the fertility of the stallions used are important factors in this, but the individual mare and her heredity is more important still. I believe it is a mistake to keep mares that are frequently barren or are poor mothers or poor doers, however good their conformation or show record. These points are carefully considered in Poland; and I have particularly good results from my Polish mares.

I now owned two stallions at stud, and efforts were made to take in more visiting mares for covering—and these of a better quality than hitherto. This

meant that a certain amount of extra grazing had to be kept in hand to supply keep for them during the spring and early summer.

Keep and service fees

This need for extra grazing coincides with the flush of grass and fits in with the general grazing; on the other hand, it means that some mowing grass is lost. The economics of this depends on the price of hay, the number of mares taken in and the charge made for keep. In my case, at 30*s.* a week per mare, with £1 or 15*s.* for pony mares, it would (theoretically) pay to have the maximum number during the full 16 weeks or so of the breeding season, buying in the hay so lost. But full utilization of the grazing is, of course, difficult to arrange.

The amount charged for keep varies considerably, and is dependent in part on the service fee for the stallion. My own horses stand at present at 20 guineas per pure-bred mare, with less for crossbreds. These service fees are an important part of the regular income of a stud farm: they are fixed literally at what the market will bear, according to the breed of horse and its individual popularity—and that results mainly from its achievements on the racecourse, in the show-ring, and as a sire.

For non-Thoroughbreds, the show-ring is almost the only available method (although an unreliable one!) of gauging the quality and value of breeding stock, and it also provides a chance for the public to see the results of one's breeding. Show-ring expenses, with seemingly poor returns, will therefore figure prominently in the accounts, but are probably well spent for advertisement purposes.

The sales side

My income from sales, like that of any pedigree stock-breeder, has naturally fluctuated widely from year to year. The best 'plums' have been gathered from a small number of exports to the U.S.A. A really first-class Arabian mare or stallion will easily make four figures, but I find that there is also a

Mares and foals run out at grass with the beef herd

steady sale for surplus colts and fillies at 1–2 years, fetching prices in the £100–400 range. Expenditure on wages, buildings and feedingstuffs is relatively high compared with that for other livestock, but nevertheless I have found that a good year with the horses may retrieve the situation, as it did when I had a poor year with the rest of the farm!

Some sharing of effort is important. For instance, I have adapted a range of buildings, with barn, old cowshed and two yards with shelters, to take both down-calving cows and young horses, running out together by day and coming in at night. The horses are bedded several together on peat, on a deep litter system, and are fed and looked after by one man at the same time as the cattle. Similarly, I believe in inter-grazing, sometimes having sheep, cattle and horses together in one field, grazing it down evenly and always leaving some pasture empty to recover. I find the suckling cows and calves settle particularly well with the mares and foals (which are out day and night throughout the summer). The sight of them together gives the owner a most satisfactory feeling of pride!

An all-year-round interest

I am aiming constantly at raising the quality of my stock by breeding and management, without resorting to extravagant feeding practices. Of course there are occasional crises, such as when I found my yearling colts standing over the bodies of two lambs, or when the gadding cattle pushed a foal through a hedge, cutting it badly. But on the whole there need be no conflict, and I believe that a horse-breeding enterprise can pay its way as part of a mixed farm. I wouldn't suggest that it is the key to an easy fortune, but for anyone who is interested in breeding, I can think of nothing to touch it for all-year-round interest and excitement.

Miss Patricia Lindsay, M.A. (Oxon), J.P., of Brackley, Northants, started breeding Arab horses in 1949. She initiated the importation of Polish Arab stock into Britain and the U.S.A., and is a council member and judge of the Arab Horse Society.

T. Kenrick Gething and **E. J. Davies**

County Land Agent for Monmouthshire

Tenant of a County Council Smallholding

describe an interesting experiment in the use of an electrically-warmed floor as a substitute for straw bedding

Electrically Heated Floors for Cattle Yards

A FULLY-COVERED cattle yard on a Monmouthshire C.C. smallholding, Ty-Deri Farm, has been the site for an experimental electrically-warmed floor. It is of steel frame construction, with 6-inch concrete block walls clad above and all round with corrugated iron; the roof is of asbestos. Adjustable ventilators, each 4 ft 6 in. by 2 ft 4 in., are in each gable end. Double doors at both ends permit the entrance and exit of stock and facilitate cleaning out. The size of the building is 45 ft by 30 ft by 12 ft to eaves, giving a floor area of 1,350 sq. ft, and it is divided into two equal areas by tubular rail fences, with a central gate.

To get evidence of the cattle's preference, one half of the yard (Section A) was heated and the other half (Section B) bedded with straw. The central gate was kept open, so allowing the cows freedom to choose between the two areas.

How the floor was warmed

The floor of Section A was of 2-in. concrete on 6 in. of hardcore, overlaid by fibre glass insulation sandwiched between two layers of single-ply roofing felt. This was covered with another 3 in. of concrete upon which the electrical cables were laid, covered with $1\frac{1}{2}$ in. of waterproof cement screed. The cables had a maximum loading of 6·8 kW, to give an estimated surface temperature of 50–55°F under all conditions. The electrical cables were kept back 2 ft from all external walls, and insulating material was placed vertically to prevent heat loss to the exterior of the building.

Thermo-couples were set in a number of places over the floor, including one in the unheated section, to enable temperature records to be taken. Input to the cables was controlled by Simmerstat energy regulators, although an overriding thermostat was set in the concrete at one side of the installation.

How the cows behaved

The experiment started during the winter of 1961–62, 22 dairy cows being housed right from the outset. Four or five cows took immediately to the heated floor area (50°F) and made no attempt to use the strawed area. The remaining 17 or 18 clearly preferred the strawed area, and at all times kept to that section.

After a few weeks, when the general pattern of the habits of the cows had become established, the temperature of the floor of Section A was raised to 55°F and at the same time the amount of straw bedding in Section B was reduced. All this was done in an effort to encourage the cows to move into Section A, but to no avail.

During the whole of this time there was no loss in milk yields and no variation in the health of the cows using either section. But, of course, the cows in Section A were very much cleaner.

Towards the end of the winter all the straw was removed from Section B. While this did not persuade all the animals to move into Section A, more were attracted, making about half in each.

Second attempt

For the winter of 1962–63, a further trial, with variation, was organized. This time the *whole* floor of the shed was heated and the number of cows using the shed increased to 30–32, thus giving a floor area of approximately 45 sq. ft per cow.

Briefly the details of the electrical installation were:

Section A

4 × 1·7 kW floor-warming cables, giving a total of 6·8 kW controlled by two Simmerstat Energy Regulators.

Section B

4 × 2 kW floor-warming cables, giving a total of 8 kW controlled by four Simmerstat Energy Regulators.

Total loading on whole of floor area (41ft × 26 ft): 14·8 kW.

The thermostat embedded in the concrete was omitted as not being necessary.

The installation was designed to run under off-peak conditions, using the restricted hour tariff, with energy input only between 7 p.m. and 7 a.m., with a midday boost between 1.30 and four o'clock. Simmerstats were chosen for control so that a reduced input could be levelled out over the whole period of availability, rather than using full input for a reduced period. In this way it was estimated that a more even floor temperature would be obtained.

Running costs

The yard was in use from 20th November, 1962, to 2nd April, 1963, (134 days). During this period the consumption of energy was:

Section A	13,181 units	Total 27,719 units.
Section B	14,538 units	

The cost, at 0·825*d.* per unit, was therefore £95 5*s.* 8*d.*, i.e., an average of 206·8 units (or 14*s.* 2*d.*) a day. The average per cow, per day, was 5·5*d.* A figure of 0·7*d.*/cow/day should be added as representative of capital costs.

It will be seen, therefore, that for a winter period of 134 days the cost per cow was in the region of £3 10*s*. This can be compared with 12 cwt of straw at £6 per ton, which equals £3 12*s*. plus costs for spreading. So the cost of heating (including interest and depreciation on capital) is about the same as the cost of bedding. But electrical floor heating has the advantage that the cost of labour in spreading the straw is avoided, as is also the cost of storing the straw.

As landlord's agent and tenant respectively, we have both been most closely connected with this experiment. As tenant, Mr. Davies is extremely pleased with the results obtained over the whole 134 days the cows have been in. The floor was wet for only two days, during which time there was particularly heavy rain and high humidity, and it would be reasonable to assume that the wetness was partly because the cows came in wet from outside. In the early stages of the experiment the floor was washed down, but even so it dried in about two hours. The scraping down of the floor and the removal of the manure took 10–15 minutes for one man each day, but the cows were very much cleaner than they had ever been when kept in straw yards, and because of it a considerable amount of time was saved in washing the cows.

Likewise, the electrical engineers are happy with the results obtained and feel that with careful observation and experience the cost, as revealed in this experiment, could be reduced. They say it would be most unlikely that there would be any maintenance costs on the electrical installation during the lifetime of the building, but should there be any fault in the electric wiring, it could be traced and repaired by cutting up a very small patch of the floor. The cost of this original installation worked out at about £8 per cow, but it must be remembered that this was the first of its kind and it would be reasonable to assume that this figure, like the running costs, could be reduced as more experience is gained.

An open mind

In estimating the cost of an installation of a similar nature, it would hardly be fair to take Ty-Deri as typical: (1) it was carried out in two sections, (2) the control gear and ancillary equipment, owing to experimental requirements, were rather more complicated than would normally be the case. The cost per kW installed tends to reduce with increase of load, since control gear accounts for a fair proportion of the total. For an installation of this size (say 14–18 kW), an overall figure of about £10–11 per kW would be fair. The question of supply to the building would naturally depend on local circumstances.

It would be imprudent in the extreme if any firm conclusions were drawn from the experiment (perhaps 'exercise' would be a better word), but it would be true to say that the results are interesting and warrant further investigation. Perhaps we may have a further trial with loose boxes later on.

The experiment was devised by the South Wales Electricity Board and the A.L.S. to determine whether an electrically-warmed concrete floor is as suitable for a dairy herd as the traditional bedded area and to obtain comparative costings. The N.A.A.S. was also concerned to see that the records kept were adequate to show up any effects on herd production and management.

Visit to BULGARIA

W. E. Shewell-Cooper

THE vast plain which runs from Sofia almost to the Black Sea gives an uninterrupted vista for miles and miles. It is obvious that the Bulgarians have done a tremendous amount of work in the last ten years or so: literally thousands of acres of fruit trees have been planted, particularly apples, pears, plums and peaches, and I was interested to see quince orchards for the first time.

Kurtovo Konare was one of a number of co-operative farms which I saw. This consists of 1,000 hectares, divided roughly into 350 h. of apples, 280 vegetables, 90 vines, 10 maize and 100 late vegetables. The population of the village in the 'range' of the co-operative is 3,500, and every able-bodied person is expected to work. Over a thousand women work on the farms, many of them hoeing tomatoes which were planted outdoors at the beginning of April. The crop (variety, Bison 10) is ready for picking in mid-June. A second planting is done on 5th May, a third on 30th May and a fourth on 5th June.

I saw no sign of artificial rain equipment; all watering was done either by hand or by flooding furrows between the plants. On this farm there were sixteen *brigades* of men and women and the foremen (they are called *brigadiers*) meet with the *Chairman* (Manager) every Friday from 9 to 12 midday to plan the following week's work in detail. On a farm of this size 140 horses, 24 light tractors, 3 medium weight tractors and 2 very heavy tractors are used.

Co-operative farm, Plovdiv

Another co-operative farm, outside Plovdiv, was said to be one of the best. It comprised two whole villages. The Horticultural Adviser showed me 50,000 frame lights for raising tomatoes, in addition to which he grows 600 hectares of vegetables, 1,800 of vines, 40 of pears and 360 of apples.

The men earn the equivalent of about £4 a week, the women about £3. They are allowed to build their own houses on a small plot of land given to them. To do this, they buy the bricks, cement and wood from the Government, and very often build the shell of the house first and then live in one room until they can afford to add to it. Thus one sees small houses of all kinds in a

A typical Bulgarian land worker

half-finished condition. Little composting appears to be done, and even the tomato haulm is burnt.

In many areas concrete glasshouses have been put up for growing tomatoes. They are heated by natural thermal springs at a temperature of 90 deg. F. Seed is sown at the end of July, the plants leaving the greenhouse about October and the whole crop finishing by the end of the following July. Kohlrabi is then sown as a catchcrop. Ten workers are allotted to a unit of $1\frac{1}{2}$ acres.

A quite different glasshouse unit was found at Bangna. This nursery was also heated by thermal springs at 90 deg. F, and pot plants are grown as well as bedding plants. The Chairman told me that they use the river soil for composting because there are no weeds in it. They don't send plants to market. People come from far and near to buy at the nursery.

The National Research Station

Though I found very few Bulgarians speak any language other than their own, yet at the universities and research stations there is always someone who can speak either French or English. At the National Research Station Professor H. Daskalov is doing most interesting work grafting melons on marrows. The actual grafting takes place in the seedling stage and is so done that the bud on the marrow seedling is not damaged. The marrow growth is trained parallel to the ground, while the melon growth is trained perpendicularly. It is claimed that as a result not only do the melons crop a month earlier but the crop yield is about double. I was able to eat delicious melons early in May, and I was told that the period of fruiting is well over four months if the marrow plants are de-flowered.

The grafting is done three days after the marrow seedling is up and five days after germination of the melon seed. A **V** graft is made and tied with a strip of cotton-wool. The cotton-wool is taken off in a week, the little grafted plant then potted up and grown on in a temperature of 75 deg. F and a

humidity of 90 per cent for two weeks. When the marrow is growing well only 20 leaves are left on the plant so as to keep the growth of the marrow and melon balanced.

There are some fifty scientific workers at this research station, three-quarters of them women. I was shown the cucumber variety Arla, which it is claimed crops better than Butcher's Disease Resisting. The seed is sown on the 15th November, planted out on 17th December and cutting started at the end of January.

At Magovan

At the Magovan Research Station, established in 1955, they have 250 hectares of trial grounds, 60 of which are used for vegetables, 10 for flowers, and the rest for orchards and greenhouses. Here they are concentrating on varieties of peas for canning. A variety called Sofia 9 bears seven peas to the pod and is held to be an excellent eight-week pea. The peas themselves were small and sweet, and the variety is especially easy for picking by machine. This research station is also doing good work on outside tomatoes. They find it best to take four stems per plant and to allow two good trusses of fruit per stem. Far heavier crops have resulted.

When planting celeriac they find it advisable to remove *all* the leaves and then to flood the ground. The crop is planted about the 5th May and harvested at the end of September, the idea being to have four rows a foot apart in the bed with a flooding trench on either side. Incidentally, this flooding trench is used by the tractors in the early weeks of land preparation. Women do almost all the work here, using spades like those in Cornwall with 6 ft handles and curved bottoms. When bent over, these blades also act as hoes.

Fruit at Kostinbrod

The fruit station at Kostinbrod has carried out hybridization between quinces and apples, and between apples and pears. The secret is to use

Adding compost to tomatoes in frames at the Kostinbrod Research Station

mixed pollen; six varieties of apples and four kinds of crab apples are used to get the 'patent' pollen. The fruits weighed about half a pound each.

I was shown models of similar sized fruits as the result of crossing apples and pears. The fruits looked like pears in every instance. The flesh is like that of an apple and the smell like that of a pear. The fruits keep well, even under poor conditions. The natural 'uncrossability' is overcome by using enzymes which are extracted from the pistils of other apple flowers.

Roses at Kazenlak

One of the most unusual research stations is outside Kazanlek. This is the State Rose Station. Here 150 hectares are devoted to roses and other scented plants, and they employ 8 scientific workers, 10 technical workers and 50 farm labourers. Bulgaria produces the best attar of roses in the world. The whole head of the rose goes into the distillery, not just the petals as I thought originally. The roses have to be picked between five and ten o'clock in the morning, when they are half open. They must be distilled within 3–4 hours of picking. It takes 3 kilos of roses to make 1 gramme of attar, and a hectare of *Rosa Damascena* gives 30 kilograms of roses. The roses are planted 6 feet apart between the rows and 4 feet apart in the rows. The great problem is rust (*Phragmidium mucronatum*), which they find extremely difficult to control. Serious attacks diminish the yields considerably.

Training students

There are two main universities turning out students with Horticultural Diplomas each year. Sofia has 350 students in all and Plovdiv 120. All are able to get jobs immediately, the best getting 125 leva a month, the others about 90 leva a month (the leva at the moment stands at 3·28 to the £1). At Plovdiv there is a true Faculty of Horticulture, whereas at Sofia the students work in the Agricultural Course. They generally have to stay at the university for five years.

The students have only one short holiday a year, and then have to work in the summer as farm labourers on the Government farms. Even at the end of the course they are required to spend one year working on a co-operative farm under the eye of the Horticultural Adviser. Students can write a thesis after they have left and so obtain a Licentiate, when they receive 30 leva a month more. When they obtain their Doctorate they automatically get a rise of 50 leva a month.

I am particularly grateful to the Bulgarian Minister in London, M. Radenko Grigorov, who made all the initial arrangements for me, to Madame Avramova, the National Chairman of the Committee for Friendship and Cultural Relations, to Mr. A. H. Lincoln, the British Minister in Bulgaria, and to Sir Harold Caccia, Permanent Under-Secretary of State at the Foreign Office, for all their help and advice.

As well as being Director of The International Horticultural Advisory Bureau at Arkley, Herts, **Dr. W. E. Shewell-Cooper, M.B.E., N.D.H., D.Litt.**, is Superintendent of the Swanley Horticultural College and Garden Editor of the B.B.C.'s North Region. His interest in the pattern of horticulture in other lands has taken him to many different countries, and his impressions of these visits have been recorded in a number of articles previously published in *Agriculture*.

humidity of 90 per cent for two weeks. When the marrow is growing well only 20 leaves are left on the plant so as to keep the growth of the marrow and melon balanced.

There are some fifty scientific workers at this research station, three-quarters of them women. I was shown the cucumber variety Arla, which it is claimed crops better than Butcher's Disease Resisting. The seed is sown on the 15th November, planted out on 17th December and cutting started at the end of January.

At Magovan

At the Magovan Research Station, established in 1955, they have 250 hectares of trial grounds, 60 of which are used for vegetables, 10 for flowers, and the rest for orchards and greenhouses. Here they are concentrating on varieties of peas for canning. A variety called Sofia 9 bears seven peas to the pod and is held to be an excellent eight-week pea. The peas themselves were small and sweet, and the variety is especially easy for picking by machine. This research station is also doing good work on outside tomatoes. They find it best to take four stems per plant and to allow two good trusses of fruit per stem. Far heavier crops have resulted.

When planting celeriac they find it advisable to remove *all* the leaves and then to flood the ground. The crop is planted about the 5th May and harvested at the end of September, the idea being to have four rows a foot apart in the bed with a flooding trench on either side. Incidentally, this flooding trench is used by the tractors in the early weeks of land preparation. Women do almost all the work here, using spades like those in Cornwall with 6 ft handles and curved bottoms. When bent over, these blades also act as hoes.

Fruit at Kostinbrod

The fruit station at Kostinbrod has carried out hybridization between quinces and apples, and between apples and pears. The secret is to use

Adding compost to tomatoes in frames at the Kostinbrod Research Station

mixed pollen; six varieties of apples and four kinds of crab apples are used to get the 'patent' pollen. The fruits weighed about half a pound each.

I was shown models of similar sized fruits as the result of crossing apples and pears. The fruits looked like pears in every instance. The flesh is like that of an apple and the smell like that of a pear. The fruits keep well, even under poor conditions. The natural 'uncrossability' is overcome by using enzymes which are extracted from the pistils of other apple flowers.

Roses at Kazenlak

One of the most unusual research stations is outside Kazanlek. This is the State Rose Station. Here 150 hectares are devoted to roses and other scented plants, and they employ 8 scientific workers, 10 technical workers and 50 farm labourers. Bulgaria produces the best attar of roses in the world. The whole head of the rose goes into the distillery, not just the petals as I thought originally. The roses have to be picked between five and ten o'clock in the morning, when they are half open. They must be distilled within 3–4 hours of picking. It takes 3 kilos of roses to make 1 gramme of attar, and a hectare of *Rosa Damascena* gives 30 kilograms of roses. The roses are planted 6 feet apart between the rows and 4 feet apart in the rows. The great problem is rust (*Phragmidium mucronatum*), which they find extremely difficult to control. Serious attacks diminish the yields considerably.

Training students

There are two main universities turning out students with Horticultural Diplomas each year. Sofia has 350 students in all and Plovdiv 120. All are able to get jobs immediately, the best getting 125 leva a month, the others about 90 leva a month (the leva at the moment stands at 3·28 to the £1). At Plovdiv there is a true Faculty of Horticulture, whereas at Sofia the students work in the Agricultural Course. They generally have to stay at the university for five years.

The students have only one short holiday a year, and then have to work in the summer as farm labourers on the Government farms. Even at the end of the course they are required to spend one year working on a co-operative farm under the eye of the Horticultural Adviser. Students can write a thesis after they have left and so obtain a Licentiate, when they receive 30 leva a month more. When they obtain their Doctorate they automatically get a rise of 50 leva a month.

I am particularly grateful to the Bulgarian Minister in London, M. Radenko Grigorov, who made all the initial arrangements for me, to Madame Avramova, the National Chairman of the Committee for Friendship and Cultural Relations, to Mr. A. H. Lincoln, the British Minister in Bulgaria, and to Sir Harold Caccia, Permanent Under-Secretary of State at the Foreign Office, for all their help and advice.

As well as being Director of The International Horticultural Advisory Bureau at Arkley, Herts, **Dr. W. E. Shewell-Cooper, M.B.E., N.D.H., D.Litt.**, is Superintendent of the Swanley Horticultural College and Garden Editor of the B.B.C.'s North Region. His interest in the pattern of horticulture in other lands has taken him to many different countries, and his impressions of these visits have been recorded in a number of articles previously published in *Agriculture*.

MILK

Future control of hygienic quality in England and Wales

IMPORTANT changes in the arrangements for controlling the hygienic quality of milk in England and Wales will come into effect on 1st October, 1964. From that date, the present system of T.T. licensing will come to an end and only those producers (mainly producer-retailers) who are required by law to sell their milk under special designation will continue to be licensed by the Ministry.

The special designation applicable to their milk and to raw milk sold by distributors will be 'Untreated', but 'Tuberculin Tested' will be allowed as an alternative description until 31st December, 1964, so that stocks of caps, bottles and cartons bearing the words 'Tuberculin Tested' can be used up.

The conditions for the issue of licences to use the special designation 'Untreated' will be broadly similar to those applicable to 'T.T.' licences, but the half-hour methylene blue test will be prescribed instead of the clot-on-boiling test, because the former is regarded as more suitable for testing raw milk as sold to consumers.

From 1st October next year, the differential in the price paid by the Milk Marketing Board to T.T. and non-T.T. producers will be withdrawn. Instead producers selling on wholesale contracts will become liable to price penalties under the dairy industry's scheme for the testing of milk for hygienic quality by first-hand buyers, which has been running on a trial basis since 1st October, 1962.

The disappearance of 'Tuberculin Tested' as a special designation for milk marks the end of a chapter in the clean milk story. Over the last twenty years the policy of successive Governments has been to encourage the production of T.T. milk. The measure of the success that has been achieved, with the co-operation of the industry, is the increase in the proportion of milk produced under T.T. licence from 6 per cent to about 96 per cent. In consequence, 'T.T.' milk must now be regarded as the basic, rather than as a special, grade of milk. Moreover, what was originally a distinctive feature of this milk and the one that most commended it to the public—the fact that it was produced from an attested herd—is now common to all milk in this country, since all herds in the U.K. are now attested. There is inevitably some confusion in

the minds of the public as to the significance of 'Tuberculin Tested', and this makes it unsatisfactory as a statutory description for some milk only.

It is probably not generally realized that the only feature now distinguishing T.T. from non-T.T. milk is that the former is subject to regular sampling and testing for keeping quality by the Ministry. Having carefully examined the industry's scheme of tests, the Ministers of Agriculture and Health have come to the conclusion that milk tested under that scheme—that is, milk sold on wholesale contracts—does not also need to be subject to routine testing by the Ministry. The new arrangements do not in any way affect the Ministry's responsibilities under the Milk and Dairies (General) Regulations, 1959, for ensuring that all milk is produced under clean conditions.

The Ministry's Publications

Since the list published in the September, 1963, issue of *Agriculture* (p. 447) the following publications have been issued.

MAJOR PUBLICATIONS

Copies are obtainable from Government bookshops (addresses on p. 506), from Divisional Offices of the Ministry or through any bookseller at the price quoted.

BULLETINS

No. 104. Cider Apple Production (Revised) 6*s.* 6*d.* (by post 6*s.* 11*d.*)

This revised edition brings all the available information on cider apple production up to date and provides a standard work for several years ahead.

No. 134. Honey from Hive to Market (Revised) 4*s.* (by post 4*s.* 4*d.*)

The modern practice of beekeeping is fully portrayed, from the time the honey leaves the hive until it is presented to the consumer.

LEAFLETS

Up to six single copies of Advisory Leaflets may be obtained free on application to the Ministry (Publications), Government Buildings, Block C, Tolcarne Drive, Pinner, Middlesex. Copies beyond this limit must be purchased from Government Bookshops, price 3d. each (by post 6d.)

ADVISORY LEAFLETS

No. 280. Ragwort (Revised)

FREE ISSUES

At the Farmer's Service, 1963.

Farming Cameo: Series 3

9. South-West Cheshire

H. V. Lea

GEOGRAPHICALLY this area of some 68½ thousand acres comprises the Rural Districts of Tarvin North and South and it extends from the northernmost parish of Ashton to the Flintshire and Shropshire borders in the south. At its eastern extremity the district boundary follows a line roughly east of the A.49 Whitchurch–Tarporley road, whilst the western boundary follows the Dee Valley and Denbighshire border as far north as Churton and the Chester district.

Most of the area is typical low drift covered country, Boulder clay of varying depth blanketing the Bunter sandstone which, together with a very equable rainfall of about 26 inches, produces one of the country's greatest grassland growing areas.

The A.41 Whitchurch–Chester road runs diagonally through the district, and the general impression motoring along this route is one of field after field of grass with well-kept hedges and a predominance of black-and-white dairy cows; only occasionally is there a field of corn, and roots other than kale are similarly infrequent. The general flatness of the countryside is relieved by trees and spinneys planted years ago for shade and shelter.

Approaching Broxton, however, to the west there emerges an outcrop of sandstone hill in the Carden area; to the east the outcropping sandstone of Bickerton Hill, thickly wooded on the steep slopes, is the start of the Peckforton Hills passing through Harthill, Bickerton, Burwardsley, and Peckforton, the ridge rising to a height of over 700 feet. This area is very attractive to hikers and day trippers in the spring and summer, to admire the panoramic views of the Cheshire plain.

The soil types here are of a very light, sandy loam with the parent rock never very far below the surface. Grass, again, is the predominant crop. A further isolated outcrop, rising to a height of about 500 feet, has the well-known landmark of Beeston Castle ruins perched on top.

Proceeding northwards the flat Boulder clay again prevails, but gives way to outcrops of sandstone in the Kelsall area. The lighter land in this northern region of the district has a collection of mixed arable farms which, whilst having dairying as a main enterprise, also forms one of the larger concentrations of early potato growers in the county.

The western side of the district, although still predominantly dairying, carries a few grassland sheep flocks. An unusual feature, due to soil type and tradition, is the localized growing of strawberries in the Farndon area.

During June strawberry baskets hanging on the farm gates denote strawberries for sale, and a great deal of the crop is marketed in this way to passing trippers as well as to the Chester shops.

The most recent statistics emphasize the importance of the grass crop in south-west Cheshire. Of the 68½ thousand acres, nearly 61 thousand are in grass, and the grassland acreage is in the ratio of approximately one-quarter leys to three-quarters permanent pasture. This 61 thousand acres carries a cattle population of almost 45 thousand, which includes over 23 thousand milking cows. The Friesian breed predominates, followed by Ayrshires. Very few indeed of the original Dairy Shorthorns remain.

Traditionally the south-west Cheshire farmer was a heavy concentrate feeder but there has been a marked swing to low-cost milk production with the emphasis on milk from grass, hay and silage.

Some of the most intensive dairy farmers in the area are now applying up to 200 units of nitrogen per acre a year. The former 'yield worshippers' are steadily being replaced by cost-conscious 'Margin of milk over concentrate seekers', and approximately 8 per cent of the farmers are co-operating in a monthly Feed Recording and Costing Scheme and compare their monthly performance figures with group averages calculated for the county. In addition, some 50 farmers are keeping detailed Management Records on forms provided by N.A.A.S.

The local Discussion Group at Burwardsley, having over 100 members, meets monthly during the autumn and winter months.

Every effort is made to extend the grazing season and, where conditions permit, the popular midseason broadcast crop of kale is grown for strip grazing. The Italian ryegrass acreage is increasing, being grown principally as an eighteen-month pioneer crop generally prior to reseeding old pasture to ley. The acreage of timothy/fescue is also going up, due to its potential for conservation and complementary growth (for grazing) to Italian ryegrass.

The development of the flail harvester has given added impetus to silage-making, and a silage conservation programme is considered a 'must' by those getting the maximum output from their grassland.

There are now farmers running herds of up to 130 cows who have reduced their stocking rate to below 1½ acres per cow equivalent. Where self-fed silage is practised on farms having these high stocking rates requiring 7–9 tons of silage per cow when kale is not grown, it is accepted that without alternating cutting and grazing, such production would not be possible. But such farmers are prepared to go for three or even four cuts for silage during the period mid-May to late-September, and the flail harvester is seldom idle.

The tendency towards increased stocking, lower concentrate use and higher nitrogen application is increasing, as indeed are the numbers of flying herds with reduction or elimination of followers in order to meet rising costs and lower milk prices. There is a developing trend towards reducing other costs of milk production, in particular those of labour and litter. The most popular type of parlour being installed in the area today is the high throughput herringbone and performances of up to 60 cows per man are being realized.

The most recent innovation is the development of cubicle housing installation which so successfully overcomes the acute litter problem. Similarly the development of mechanizing slurry handling is very much to the fore in the area and other parts of this county of dairy farmers.

GEORGE YOUNG
Agricultural Land Service, Preston

High, Wide and Handsome

THE fertile plain of south-west Lancashire grows crops which are second to none in both quality and quantity. Intensive growing of vegetables for the canning industry has revolutionized the farming system, and when to this is added a shortage and high cost of labour, due to industrial competition, and the highest degree of mechanization in the county, if not in the country, it is easy to see the problem of trying to fit existing buildings into this system.

The old farmsteads were brick built and usually housed a barn, stables and cart-shed. Sometimes there was a shippon or a few loose boxes, but that was usually about the extent of the fixed equipment. In the earlier parts of this century a Dutch barn or two appeared, chiefly to house the corn crops prior to threshing. Potatoes were stored in the field and vegetables were sent straight from field to market.

The revolution has made the binder rare, and the combine with tank for bulk handling of grain has taken the place of sheath corn. Potatoes are now stored indoors, and in the winter are graded, sacked or pre-packed on the farm. Vegetables come indoors to be prepared for market.

Hampered by such a set of small old-type buildings farmers must often be asking where they can find accommodation for all their implements, for grading machines, machinery maintenance and space for crops in bulk store.

A loading ramp, built at lorry height, makes the dispatch of prepared crops easy

The clear span and high headroom of the new building are well illustrated here

Mr. W. H. Symondson, of Robinsons Farm, Lathom, near Ormskirk, needed a homestead that would house 300 tons of potatoes for three to four months in the autumn and winter, storage for a large range of arable machinery and space to service it, handling accommodation for 300 tons of grain, room for vegetable packing and storage.

After assessing the areas needed for these items, it was finally decided to erect one large building which could be used for all these purposes and which was adaptable to any change in the farming policy, including the introduction of cattle if that should become desirable.

The new building is 50 feet wide, 105 feet long and 13 feet high at eaves level. It is of portal frame construction, to avoid the restriction of height which a tie beam causes where elevators, fore-loaders and fork-lift trucks are in constant use. It has a concrete frame with asbestos roof and sheeting to 6 feet from the ground. The building is enclosed by a 6½ feet-high concrete block wall, reinforced and insulated so that potatoes can be stored with the minimum use of straw bales. The floor is also of concrete, and holes were left in it to enable lines of fencing to be quickly erected to form divisions between crops and other uses.

The contours of the site have been used to provide two-level loading. The sliding doors at one end form the entrance for all machinery and crops, and at one side a loading bay has been made at lorry height for easy dispatch of prepared crops. The building is well lighted, in day-time by means of roof lights made of plastic sheets, and at night by electric lights suspended on catenary wires. Electric power in both single- and three-phase is provided in each bay of the building, so that long, trailing wires are unnecessary wherever machines are being used in the building.

The frame of the building cost £2,040 and the building work, joinery and electricity a further £1,600—a total cost of £3,640. For this expenditure, less a third grant under the Farm Improvement Scheme, Mr. Symondson has a high, wide and handsome building which will need little maintenance (no painting at all) and which is meeting all his present needs.

IN BRIEF

Stupefying Wood-pigeons

Unfortunately, exceptionally persistent snow seriously interfered with last winter's programme to catch wood-pigeons with stupefying baits. These baits were of tic beans and maple peas, treated with 1·5 per cent by weight of alpha-chloralose, laid on clover leys and pastures. Between late December and early March the birds' clover feeding grounds were inaccessible, and the pigeons moved to places where brassicas stood above the snow. By March, few pigeons were to be seen, which added to the difficulties of finding suitable sites. However, similar conditions would follow any successful control operation, so that in this sense a reduced population was a realistic experimental situation.

Nineteen separate trials, throughout the Ministry's Eastern, East Midland and South-East regions were completed, and for each trial either 44 lb of maple peas or 71 lb of tic beans were spread over areas 100 × 100 yd, giving a bait density of one grain per sq. foot. Wood-pigeons and other harmful species were killed, but game birds and protected species were carefully looked after in wicker pigeon baskets and allowed to recover.

A variable amount of chloralose was lost through weathering, with the result that some birds ate sub-narcotic doses and, being only partially affected, eluded capture. Of 1,003 wood-pigeons affected, 47 escaped and of 147 game birds, 12 escaped.

THE RESULTS

		BIRDS CAUGHT									
		Wood-pigeon	Stock Dove	Pheasant (released)	Pheasant (died)	Partridge (released)	Partridge (died)	Rook	Jackdaw	Skylark	Chaffinch
Tic beans	8 trials	548	2	7	1	4	—	—	2	—	—
Maple peas	11 trials	408	3	48	3	66	6	4	—	1	2
TOTAL	19 trials	956	5	55	4	70	6	4	2	1	2

It can be seen at once that the danger to small protected birds was virtually eliminated when large baits like tic beans and maple peas were used (c.f. earlier work with cereal baits), and this confirmed small-scale experiments done in 1960 and 1961. Of the three small protected birds taken, two recovered and were released but one chaffinch died. It had fed on some broken pea fragments—a risk that could be eliminated with better quality baits.

Tic beans seem to be a more useful bait than maple peas, since they appear to catch more wood-pigeons and fewer pheasants and partridges. This may be so, but the present results could have been achieved by chance and are insufficient to prove the point statistically.

In three trials carrion-crows were seen attacking stupefied pigeons and game birds; resulting deaths have been included in the above calculations. There were no

cases of secondary narcosis and, since an animal like the fox would need to eat many carcasses (including the crop contents) before being affected, the risk must be negligible.

Although the trials last winter gave promising results, the need remains to reduce the game bird risk even more. To achieve this, field trials are planned for the forthcoming winter. In part these experiments will be aimed at checking the above findings in a longer series of trials but, more important, they will attempt to present bait in such a manner that only wood-pigeons feed on treated bait, while partridges and pheasants eat untreated, harmless baits. Other wild-life dangers now seem to be eliminated.

Alpha-chloralose, which chemically is a substituted glucose derivative, breaks down in the animals' tissues and does not leave harmful residues. Birds that recover do not suffer further ill-effects.

R. K. Murton

An initial article 'Narcotics v. Wood-pigeons' by Dr. R. K. Murton appeared in the October, 1962, issue of *Agriculture*.

Tomatoes on Straw Bales

Growing cucumbers in small beds on top of treated straw bales is now well established and proving of great benefit to growers, but it is only this year that the possibility of extending the method to tomatoes has been considered. Trials are going on at the Lee Valley Experimental Horticulture Station to see whether this technique has commercial possibilities.

Whereas cucumbers are generally grown on beds raised above ground level, it is more normal to find tomatoes planted direct into the border soil or in cardboard rings filled with compost and stood on the soil base. Thus it may be difficult to visualize any advantage in raising the plants well above soil level by growing them on treated straw bales. Nevertheless, there are indications that this method can be economic and also have certain advantages over the traditional system.

At the present time tobacco mosaic virus is causing serious loss of quality and of total yield in many nurseries, and where tomatoes follow frequently on the same land, it is known that root debris remaining in the soil from a previous infected crop is one of the main sources of virus attack. Of the various methods of soil sterilization used by growers, none will give a complete control and the virus often shows up in a matter of weeks after planting.

Now, if virus-free plants are set out on treated straw bales isolated from the soil beneath by wide sheets of polythene, there is a good chance of growing a crop with a low incidence of virus, provided the structure of the house is cleansed and there is no carry-over by workers on contaminated hands or clothing. This system would also be helpful with certain pests and diseases which attack tomato roots and so reduce yields.

Enrichment of the normal level of carbon dioxide in the glasshouse atmosphere can be beneficial for tomatoes, and large quantities of straw—approximately 70 tons per acre in this case—have been shown to give a material increase in the CO_2 level while fermentation is proceeding actively. The temperature generated during this process can be particularly useful with a crop planted early in the year, since it will ensure an adequate temperature around the roots at a crucial period.

By using straw bales isolated with polythene sheets from the soil beneath, it is possible to replant a glasshouse after some other previous crop with only a break of 7–10 days from the time of placing the straw bales in the glasshouse, provided care is taken with the pre-planting applications of nitrogen fertilizers to the bales. In this respect there may be more latitude with tomatoes than cucumbers, as the former require a lower nitrogen level in the early stages after planting.

The economics of this method seem to be quite satisfactory if straw bales can be bought at a reasonable price, and in the eastern counties of England in a normal year it should be possible to obtain wire-tied wheat-straw bales, which are preferred, at £3–6 per ton according to quality, condition and season. In addition to this there will be the cost of polythene sheeting and a quantity of virus-free soil, in which to set the plants on the bales. To offset these costs, there will be the saving on organic matter, normally dug in when preparing the houses, and soil sterilization can either be considerably reduced or obviated entirely.

At the Lee Valley Station a crop planted on treated straw bales at the end of January is still in production, having given a very satisfactory yield, and in another house late-planted tomatoes for autumn cropping promise well. Although this is the first year that the technique has been tried and certain refinements are bound to follow with more experience, the indications are that in due course it will become an established practice and take its place to help growers maintain or increase the economic return from their holdings.

P. G. Allen
Lee Valley E.H.S.

The Broiler Industry: What price expansion?

The expansion of the British broiler industry has been one of the most spectacular developments in post-war agriculture. Over the last two years, however, the broiler business has been bedevilled by price slumps, caused by oversupply, with the consequent elimination of a number of broiler rearers followed about nine months later by a much higher price and a violent expansion. In the face of these see-saws of prices and production, there are those who believe that the limits of expansion have been reached. But a few bold spirits still fix their eyes on American consumption levels and believe the U.K. industry can and must reach these heights.

What are our chances of doing so? To make any kind of guess we must compare living standards in the U.S.A. with those here, also custom and tradition, the situation with regard to the supply of other foods available to the consumer and, not least, the possible developments in the field of broiler production.

American meat consumption per head is about 200 lb a year; ours is around 132 lb. And of the total meat consumed in the U.S.A. only about 32 lb per head per year is chicken. Since chicken is the cheapest form of meat available there, it is clear that price alone is not the major factor dictating consumer choice.

Then there is the difference in consumer taste. We eat more lamb per head than do the Americans. Are British housewives really going to prefer chicken to lamb merely if it is cheaper?

But should our standards of living rise to the American level and, in consequence, our total meat consumption go up, then in any attempt to gain a greater share of the consumer's purse, the broiler supplier must look to his competitive costs—both on absolute grounds and relative to other foods, particularly meat. This calls for an inquiry into costs of production and a comparison with those in the U.S.A.

The broiler has a low food cost per pound live weight gained because it is marketed at an early age. The Americans kill at a younger (and therefore lighter) stage to get the full benefit of the very fast growth rate. This seems essential with their small margins. We too could reduce our costs if we marketed a lighter bird. We could approach the American cost figure if our hatcheries accepted a lower chick price, the rearers a small margin and the marketing chain very much smaller margins.

These developments have taken place in the U.S.A.; if we intend to expand still further we may have no alternative but to follow that pattern—but our feeding-stuffs are still priced higher and our red meat relatively lower. It is well to remember that the American expansion has been achieved at the cost of near-bankruptcy by some producers.

R. Coles

Books

Vistas in Botany. Vol 2. Applied Botany. Edited by W. B. TURRILL. Pergamon Press. £5.

In the flood of scientific publications the reviews, summaries and surveys stand out as islands of firm ground upon which the enthusiast or the aspiring expert can stand until he is conversant with the ebb and flow of knowledge and theory in his particular sphere. This book is not merely an island, but a veritable archipelago.

Here in one volume is a series of surveys by experts in ten fields of applied botany, from grassland research, cereal breeding and plant pathology to applied ecology, the uses of seaweeds and the origins of horticultural plants. Naturally, in a collection of this kind the monographs vary in their scope and depth of treatment, but underlying all is a unity of purpose that keeps each in perspective.

A particularly interesting account is written by Dr. F. N. Howes on economic plant products, whose range and diversity, as pointed out by the editor, is seldom realized even by botanists. Dr. Howes emphasizes that while fundamentally the same plants have been used for food for thousands of years, for other purposes, e.g., in the tanning industry, different plants have been exploited at different times.

Other developments in the utilization of plant products is illustrated in the comprehensive survey on the uses of seaweeds by Professor L. Newton, who describes the change from casual harvesting to the large-scale commercial exploitation of seaweeds for various products, which was started during and since the last war.

Another outstanding contribution to the volume is the survey by Dr. G. D. H. Bell, who gives a detailed account of the historical background and the modern techniques of cereal breeding.

The book has extensive and useful bibliographies and should therefore appeal particularly to teachers and students. In addition it could widen the interests of the professional botanist and stimulate enthusiasm in the amateur. Unfortunately its price must surely place it beyond the personal ownership of those to whom it could be most useful. It is surprising, too, that although the volume is in general admirably produced, many of the plates seem valueless and some are poorly reproduced. *R.J.C.*

Agrindus. H. HALPERIN. Routledge and Kegan Paul. 35*s*.

It is a prerequisite for the economic development of a country that a 'drift from the land' takes place to enable its farming to assume a commercial basis and to free manpower to develop its industrial sector. This process has produced the position in the United Kingdom that only about 4 per cent of the population remain in the agricultural industry, and large areas of even this small country are barely inhabited.

The idea of Agrindus, as developed by Professor Halperin, seeks to harness this movement of surplus people out of farming in such a way as to avoid both the growth of enormous metropoli and the complete depopulation of the countryside. Essentially the idea is one of the comprehensive regional integration of agriculture and industry, hence the rather horrible word 'agr(iculture) and indus(try)'. At the centre of each agrindus is the more or less non-residential regional town, and on its periphery are the villages which are the units of social life.

The historical development of Israel provides many examples of progress through the voluntary co-operation of its people, the fullest expression of this unanimity of purpose being reflected in a Kibbutz. This is a collective village based mainly on farming, whose members pool their resources and meet their needs out of a common fund. Agrindus aims to extend this spirit and exercise of co-operation, the regional town, for example, constituting 'the expression of regional co-operation between the villages'.

In the town all the non-agricultural activities of the region will be carried on. Here will be organized the administration, health services, schools, markets, smaller factories, food-processing plants and so on. The workers in all these sectors will be those who are surplus to the needs of a modernized agriculture, but they will continue to live in, and be active members of, their villages. The geographically central position of the regional town will ensure that the workers do not waste hours getting to and from work.

The development of Agrindus will therefore not disturb the present character of the collective villages; it can, in fact, contribute to their own progress, for the earnings of the town workers will bring in new wealth to the common fund.

The idea of non-residential towns would appear to be a little unrealistic until one remembers, for example, that the city of London becomes virtually deserted when the rush-hour is over.

The policy of Agrindus, in the full sense in which it is expounded by Professor Halperin, may have little direct relevance to established industrial countries such as our own, but the book may well suggest to our town and country planners propositions to halt the concentration of population and sprawling suburbanization of south-east England. *W.J.K.T.*

Handbuch der Pflanzenphysiologie (Encyclopaedia of Plant Physiology) Vol. 17, Part 2. Physiology of Movements. Springer-Verlag, Berlin. D.M. 340.

Everybody knows that plants are generally less mobile than animals in the sense that they cannot move autonomously from place to place. Nevertheless, botanists are well aware that there are plants, such as unicellular algae, that are capable of living a motile life in fresh water, and that some plants have motile sperms.

In the glasshouses at Kew, visitors can see the well-known sensitive plant (*Mimosa pudica*) whose leaves, when touched, immediately bend downwards and the leaflets fold together. Some may have noted the trapping devices and the movements of the glandular hairs exhibited by insectivorous plants as they capture and digest their prey. Other people may have been startled by the sudden emission of seeds from the fruits of a Squirting Cucumber (*Ecballium elaterium*) or from the capsules of the Policeman's Helmet Balsam (*Impatiens glandulifera*).

Then there are growth movements such as the twining of the stems or tendrils of climbing plants around their supports, the curvature of seedlings towards a source of light, whilst under the microscope we can observe the living protoplasm streaming within the plant cell.

Movements such as these may be controlled by temperature change, by the force of gravity, by chemical substances, or they may even be regarded as autonomous. The mechanism of these movements is, however, much more complex than this simple statement might be taken to imply, and although the subject has been studied for many years, there is still a great deal about it that is far from being completely understood.

It is therefore of great importance that our knowledge of this fascinating subject has been summarized in a volume of 1,174 pages, forming part of the great Encyclopaedia of Plant Physiology which is being produced by an international group of specialists and is edited by some of the leading authorities on plant physiology through the world.

The present volume consists of 16 essays in German, nine in English and two in French, each dealing with a special aspect of the physiology of 'movement' in the plant world. The essays are supported by separate bibliographies and by indexes to authors and subjects.

This, and other volumes of the outstanding reference book of which it forms part, will no doubt be found on the shelves of all libraries that can afford it. The production of this treatise would, however, have been of even greater service to botany if it could have been published at a lower price. *C.R.M.*

The Living Landscape of Britain. WALTER SHEPHERD. Faber and Faber. Paperback edition. 13*s.* 6*d.*

Many countrymen and country-lovers have longed to know more of the origin of their favourite landscapes; but they have been put off by the apparent necessity to learn a large number of technical terms in order to comprehend even the most elementary textbooks of Geology and Geomorphology (the scientific study of landforms). Here is a book for such people, written in a very individual style, with the essential principles discussed in simple language. The text is well illustrated by clear line diagrams and a photographic supplement, though the reproduction sometimes leaves a little to be desired. The illustrations are a happy blend of familiar examples and less well-known instances.

The writer follows the precept of the father of Geomorphology, James Hutton (himself something of a farmer), in stressing the fundamental importance of valleys in landscape interpretation. The complications introduced by geological structure, weathering, and the attack of ice and sea upon the land are then gradually unfolded with a minimum of jargon. These topics are introduced in an order which is more related to the general experience of the beginner than the conventional order of most text-books.

Geologists usually cease to be interested in landscape development during the historic period, but Shepherd continues right up to the present, though he spends more time on prehistoric man than upon the effects of the post-medieval period, which were perhaps of greater importance.

Despite the simplifications inevitable in such a book, the author maintains a very high standard of accuracy, though his views on the efficacy of marine currents as against wave action in moulding shoreline forms, and again in discussing the origin of stalactites, are rather old-fashioned. The purist might quibble about one or two of the captions to the plates.

For those who wish to read further about this fascinating subject a useful book list is included, but it has not been brought up to date since the original publication in 1952. Although the book is well printed, it is a pity that printing costs have made the price so high for a paper back of just over 208 pages. *G.T.W.*

Pheasant Rearing. ELEY GAME ADVISORY SERVICE BOOKLET NO. 8

The Eley Game Advisory Station is the successor to the I.C.I. Game Services and has retained the old tradition of publications. This booklet, which has been extensively revised, is one of a series dealing with different aspects of game production and the control of vermin that affect game birds.

The main rearing systems are described fairly fully and their advantages and disadvantages outlined. The photographs and line drawings are a great help in following these notes. Incubation and broodies are not included, as they are the subject of another booklet.

Feeding is discussed in relation to methods and food. An average guide to food consumption per 100 birds at different stages and overall to 21 weeks of age on a diet of crumbs, pellets and grain is a useful guide when budgeting. The procedures for releasing birds to coverts and, more important, persuading them to stay there long enough to be available for shooting, are described.

There are two useful appendices, one giving sources of supply of pheasants and pheasants' eggs, and the other giving the list of suppliers of any equipment mentioned. Printing and production are good and the booklet is easy to read. Copies are obtainable, free, from the Eley Game Advisory Service, Fordingbridge, Hants. *W.M.A.*

Science and the Glasshouse (3rd Edition). W. J. C. LAWRENCE. Oliver and Boyd. 25*s*.

In this revision Mr. Lawrence has added some new material in the sections on composts and propagation but the information is, in the main, very similar to that given in previous editions. The arguments in favour of care and precision at all times in the treatment and preparation of composts are clear and convincing and should prove effective—if any remain to be converted.

There is no mention of soilless composts—possibly for the good reason that Mr. Lawrence writes only about trials and investigations with which he has been in close contact—but no doubt he would agree that by using even more care and precision, such composts may have a place.

The importance of the size of container in achieving the quickest development of a plant is emphasized. In this connection, most early tomato producers now use a 4½ in. container, which has proved to have several advantages over the 3½ in. pot used in the experiments at John Innes.

The section on the importance of light has been considerably expanded. Sources of light, and the best areas of natural light, are described in detail and illustrated by tables and maps, with a firm recommendation that new glasshouses should be sited in such areas. These occur mainly in coastal districts, but not necessarily only in the south.

The type of house, its orientation, and construction to make the most of natural light also receive detailed comment. The suggestions embody the latest information on the subject, and it is interesting to note that a number of houses of 60 ft or more in width, oriented east and west, have been constructed and are now in use, a development due largely to the work done by the author. With regard to the emphasis on the importance of light, there is a reference to the 'winter ill' of 'carbon deficiency' on glasshouse plants. I wonder if the trials and investigations now in progress on the enrichment of the glasshouse atmosphere with CO_2 will provide a basis for some slight adjustment of our ideas on this matter.

The book is delightfully written and the digest at the end of each chapter presents the reader with the essential points in easily accessible form.

A minor error on page 173, where 'Mansard' is shown as 'Hansard', gives one type of house a parliamentary leaning!

Like its previous editions, the book can be confidently recommended to all those who wish to acquaint themselves with the scientific aspects of glasshouse construction and use. *A.D.H.*

Shell Guide to South-West Wales. VYVYAN REES. Faber and Faber. 15*s*.

One of a series edited by John Betjeman and John Piper, this book deals with what is probably one of the least known areas of Great Britain, embracing the counties of Pembrokeshire and Carmarthenshire. This part of the country is rapidly becoming more popular with tourists, however, and a guide of this kind is especially welcome. It is also appropriate for the resident who wishes to learn more about the history and architecture of his own district.

The book is well produced, with an excellent and comprehensive set of photographs and a map of the two counties. Specially noteworthy are the end-papers which show exteriors of chapels in the two counties, a traditionally non-conformist area. Other photographs to be commended are those of the roof of St. David's Cathedral and Llanelly Perspectives. There is a coloured photograph by John Piper as frontispiece showing Croes-Goch Chapel. Here, however, one of the few mistakes in the production has been made, since it ascribes the building to Carmarthenshire whereas it is situated near St. Davids in Pembrokeshire.

There is a comprehensive gazetteer of parishes in the two counties. The author might be criticized for concentrating rather too much on ecclesiastical architecture, but in this district of architecturally rather undistinguished villages there was probably no other choice.

Nevertheless, the text is not without humour and comment, as in this passage taken from the entry for Crymmych, a 'raw' village in North Pembrokeshire. 'What you may think from a distance to be an airport control tower turns out as you get closer to be a modern school in glass and yellow brick, with the Prescellies for its Campus'; or again, from the entry for Llangwm, 'Once the centre of the Milford Haven oyster industry but now down to cockles'.

The author effectively draws the distinctions between the two counties; Carmarthenshire with its predominantly green landscape of small dairy farms and traditional Welsh way of life; Pembrokeshire with its more open landscape, its arable farming in the south and its off-shore islands with their wonderful sea-bird colonies; and also, of course, its division of peoples—Welsh-speaking in the north and English in the south. *E.M.T.*

ACKNOWLEDGMENT OF PHOTOGRAPHS

We gratefully acknowledge permission to use the following photographs:

p. 457. The Mustograph Agency; p. 458. John Topham Ltd.; p. 460. Professor Cooper; p. 462. B. Platt; p. 465. Worcestershire Farmers Ltd.; pp. 467 and 469. R. F. R. Glanville; pp. 468 and 470. A. E. Moss; pp. 474 and 475. Howards of Andover Ltd.; pp. 483, 485 and 486. Patricia Lindsay; pp. 491 and 492. Horticultural Photo Supply Service.

AGRICULTURE

Price 1s. net monthly (by post 1s. 4d.).

Subscription Rates (including postage):

Home and Commonwealth: 14s. per annum. Foreign Countries 15s. per annum

Subscriptions may start with any issue and should be sent to:

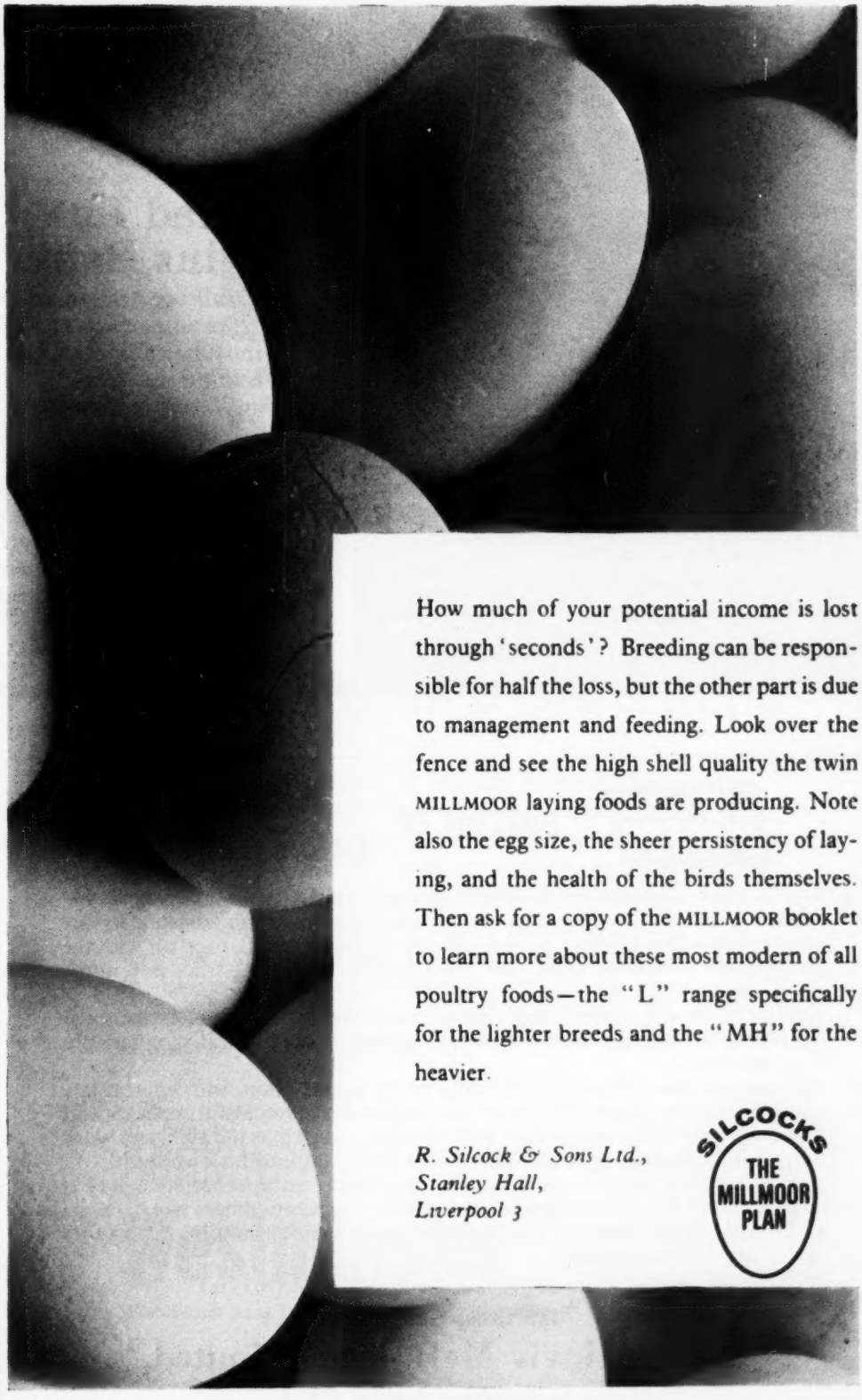
HER MAJESTY'S STATIONERY OFFICE

York House, Kingsway, London W.C.2
13a Castle Street, Edinburgh 2
39 King Street, Manchester 2
35 Smallbrook, Ringway, Birmingham 5
423 Oxford Street, London W.1
109 St. Mary Street, Cardiff
50 Fairfax Street, Bristol 1
80 Chichester Street, Belfast

Single copies can be purchased from any of the above-mentioned addresses or through a bookseller, price 1s.

Printed in England for Her Majesty's Stationery Office
by Hull Printers Limited, Willerby, Hull, Yorks.

(K109) 72-1-63-10


How much of your potential income is lost through 'seconds'? Breeding can be responsible for half the loss, but the other part is due to management and feeding. Look over the fence and see the high shell quality the twin MILLMOOR laying foods are producing. Note also the egg size, the sheer persistency of laying, and the health of the birds themselves. Then ask for a copy of the MILLMOOR booklet to learn more about these most modern of all poultry foods—the "L" range specifically for the lighter breeds and the "MH" for the heavier.
R. Silcock & Sons Ltd.,
Stanley Hall,
Liverpool 3
SILCOCKS
THE MILLMOOR PLAN

I'm glad I use Martins Bank

"They really do understand a farmer's problems and I found them most helpful when I was modernising my farm..."

Martins Bank brings out an excellent little book annually giving up-to-date information on subsidies and grants. It's called "Finance for Farmers and Growers" and you are welcome to a copy at any branch.

Martins Bank Limited

F18

rhm

DIRECTOR OF **ANIMAL NUTRITION**

- This is a new appointment involving, amongst other responsibilities, the extension of existing facilities so as to provide a national farm advisory service appropriate to the Group's activities in animal feedingstuffs, together with the formulation of animal feeds, the co-ordination of feeding trials and nutritional research.

  Applicants should be aged 40-50 and have obtained a position of eminence in the field of animal nutrition, coupled with practical administrative experience at a high level.

  The appointment will involve building up an organisation, with appropriate scientific backing, to provide the services required; the successful applicant will require considerable energy and determination, as well as the ability to work well with colleagues, to select staff and to build and lead his own team.

  This is a senior position in a large organisation; an appropriate salary is envisaged and the appointment is pensionable. The appointment will be based in London or the South of England, but considerable travelling is required and a car will be provided.

- *Write briefly and in strict confidence, quoting Ref.* 14*N*/63, *to:*

The Group Staff Manager,

Ranks Hovis McDougall Limited,

53 Eastcheap, London, E.C.3.

Figures aren't everything

When you talk farm finance with the manager of a Westminster Bank country branch, he won't stop short at the figures. He'll understand what is behind them, see your ideas as *you* see them, in terms of a practical farming problem. He can do this because, although a banker by profession, he is a countryman at heart, able to see with an understanding eye the possibilities—and problems—of the land by which his customers live. That is one reason why more and more farmers, growers and nurserymen today prefer to . . .

Bank with the

Westminster

Westminster Bank Limited, Head Office: 41 Lothbury, London, E.C.2

BOOKS

on

AGRICULTURE
HORTICULTURE
ANIMAL HUSBANDRY
and
VETERINARY SCIENCE

Catalogues sent on request

★

Lewis's Scientific Lending Library

ANNUAL SUBSCRIPTION (Town or Country) from £2 5s. 0d.

Prospectus sent on request

The Library includes all recent and Standard Works on Agriculture, Botany and Allied Subjects

★

H. K. LEWIS & Co. Ltd.
136 GOWER STREET, LONDON, W.C.1
Telephone: EUSton 4282

AS OLD AS CROP SPRAYING

It is more economical to use Bordeaux and Burgundy mixtures

HAVE YOU TRIED?

The 'instant' method of preparing Bordeaux mixture directly in the spray tank for medium or high volume applications through conventional types of boom sprayers.*

DID YOU KNOW?

Potash-Burgundy (a Burgundy mixture made with Potassium carbonate instead of washing soda) can be applied in ultra low volume (4 gallons or less per acre) through aircraft.*

* *For further particulars write:*
McKECHNIE BROTHERS LIMITED
P.O. Box No. 4,
Ditton Road, Widnes, Lancs.

AS MODERN AS THE HOUR

IT PAYS!

To Read

Subscription Department:
Ministry of Agriculture,
Fisheries and Food (Publications),
Government Buildings,
Block C, Tolcarne Drive,
Pinner, Middlesex.

To Advertise

Advertisement Representatives:
Cowlishaw & Lawrence,
(Advertising) Ltd.,
16 Farringdon Street,
LONDON, E.C.4.

Agriculture

The Journal of the Ministry of Agriculture

FIVE financial aids for Farmers

At the Midland Bank 'service for farmers' is far from being an empty phrase. Here, in the brief statement of the Bank's policy which follows, are five specific ways in which the Midland Bank is ready to give financial assistance to its credit-worthy farmer customers.

1 The Midland Bank will supplement the working capital of a credit-worthy farmer to an extent which will ensure the efficient farming of his holding.

2 An especially liberal line will be taken with a young farmer making his way.

3 Where a farmer puts himself in the hands of the N.A.A.S. or other qualified advisers and they are of opinion that with more credit greatly improved results will be shown, the Midland Bank can normally supply that credit.

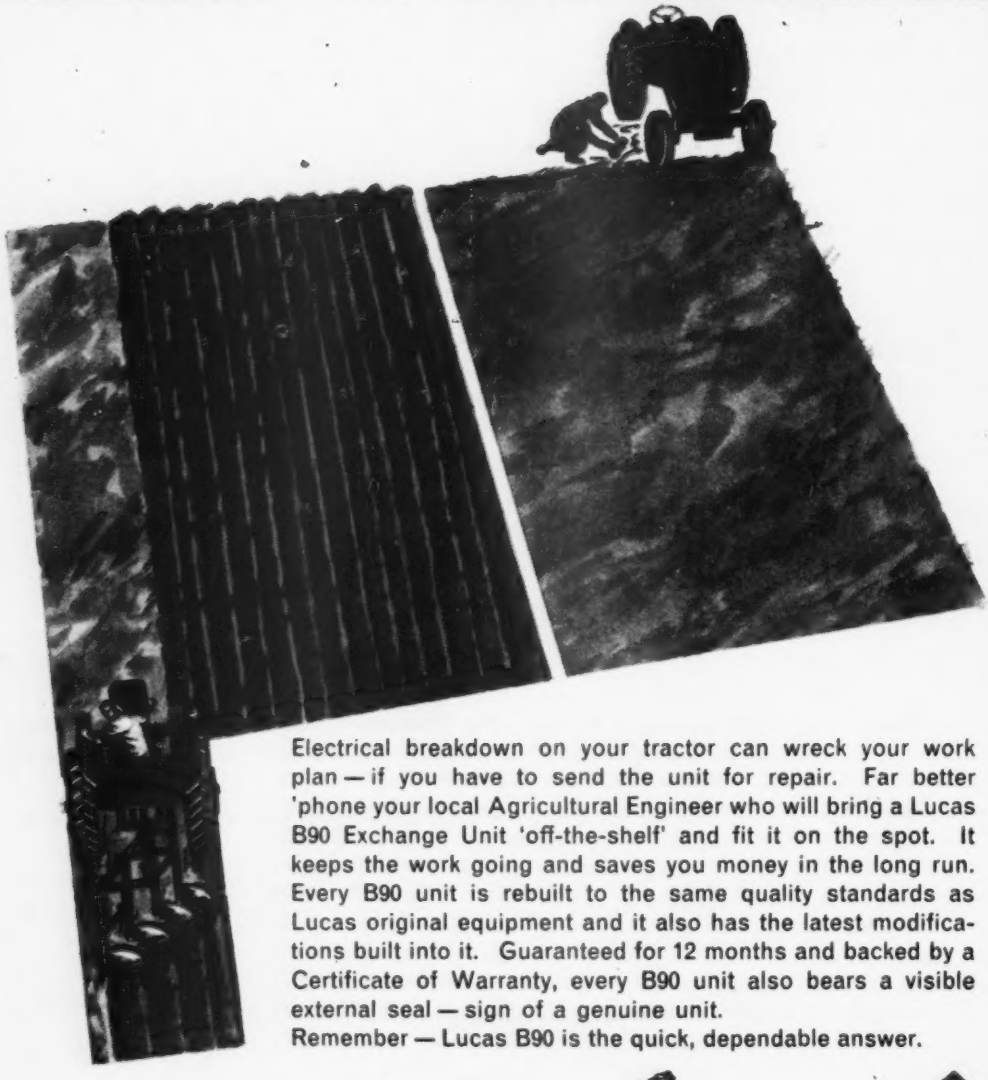
4 If advances are required to finance the purchase of machinery and implements they will be made at normal banking rates with repayments spread over 2/3 years.

5 In approved cases the Midland Bank is prepared to finance the purchase or improvement of farms.

If you would like to know more about the assistance you can obtain from the Midland Bank, go and see the Manager of your nearest branch. He is there to help you.

MIDLAND BANK

WHAT A DIFFERENCE



Electrical breakdown on your tractor can wreck your work plan — if you have to send the unit for repair. Far better 'phone your local Agricultural Engineer who will bring a Lucas B90 Exchange Unit 'off-the-shelf' and fit it on the spot. It keeps the work going and saves you money in the long run. Every B90 unit is rebuilt to the same quality standards as Lucas original equipment and it also has the latest modifications built into it. Guaranteed for 12 months and backed by a Certificate of Warranty, every B90 unit also bears a visible external seal — sign of a genuine unit.
Remember — Lucas B90 is the quick, dependable answer.

NOV 1962 NOV 1963

WITH THE LUCAS

B90 UNIT EXCHANGE SERVICE

JOSEPH LUCAS LTD · BIRMINGHAM 19